The Effect of Acute Exercise Type on Body Image Attitudes

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Abstract

The current study examined the effect of two types of acute exercise (resistance and mind-body yoga) on state body image attitudes, to see which, was most effective at reducing body image concerns. It was hypothesized that both types of exercise would lead to improvements in body image, with yoga showing the biggest benefits. College-aged female non/infrequent exercisers (n = 40) completed state measures of body satisfaction, social physique anxiety (SPA), and appearance orientation prior to and following participation in a single yoga and resistance class. Participation in the yoga class was associated with decreases in SPA and increases in body satisfaction. However, participation in the resistance class was associated with no changes in any of the study variables. These findings indicate participation in a single yoga class may have positive effects on body image attitudes, which may encourage non-exercisers to become more active.

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CHAPTER 1: REVIEW OF THE LITERATURE

1.1 *Body Image*

Body image is defined as an individual's internal representation of his/her outer body (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). It is a multidimensional construct that includes an individual's emotions, cognitions, perceptions and behaviours regarding his/her body (Pruzinsky & Cash, 2004). Although body image is often considered to be synonymous with physical appearance, it also includes other aspects such as fitness, health and overall functioning of the body (Pruzinsky & Cash).

Cash (1994) distinguished between body image *perceptions*, which refer to the accuracy with which people perceive their body size, and body image *attitudes*, which refer to the cognitions (beliefs such as evaluation and investment), affect, and behaviours related to the body. The evaluation component refers to an individual's satisfaction or dissatisfaction regarding his/her body image, and is most often measured as the discrepancy between an individual's ideal and perceived body image (Muth & Cash, 1997). Investment in body image is the level of importance the individual places on his/her body and is represented by focus on the body, the importance of the body to one's self-concept, and behaviours that are related to the management of one's body (Muth & Cash). Finally, affect refers to the emotions or feeling states (either positive, such as body esteem, or negative such as anxiety) that arise about one's body (Muth & Cash).

1.2 *Body Image Trait and State Characteristics*

Body image has both trait (i.e., stable, dispositional characteristics, or how people usually think, feel and act) and state characteristics (i.e., situational, temporary changes of body image experiences within individuals; Cash, 2004b). The majority of body image literature and assessment measures have examined body image as a trait characteristic. However, Cash, Melnyk, and Hrabosky (2004) suggested that to effectively assess body image, the individual's body image states in a specific context or in response to experimental situations must be examined. Research has demonstrated that negative state body image is positively related to trait body dissatisfaction, body shame, body surveillance, dysfunctional investment in appearance, disturbed eating attitudes, and maladaptive body image coping strategies in women (Cash et al., 2004; Melnyk, Cash, & Janda, 2004; Rudiger, Cash, Roehrig, & Thompson, 2007). Further, Cash et al. (2004) found that state body image satisfaction was poorer in women compared to men, as well as in individuals who had a higher body mass. State body image satisfaction is also higher in positive body image situations (e.g., a friend complimenting your appearance) than in negative body image situations (e.g., reading fitness magazines; Cash et al., 2004).

1.3 *Cognitive-Behavioral Model of Body Image*

Body image attitudes are at the center of the cognitive-behavioural model of body image as outlined by Cash (2004a; see Appendix A). This model is described as a heuristic model, meaning that it outlines general constructs hypothesized to be related to body image. However, the direction of the relationships and the specific factors comprising each construct are not detailed to allow it to be applied to a variety

of settings and individuals. The model includes historical and developmental influences on body image in addition to proximal events and processes. The historical and developmental influences include four factors: cultural socialization, interpersonal experiences, physical characteristics, and personality attributes. Cultural socialization refers to the messages that a particular culture possesses about the standards and expectations regarding appearance. These messages are used to describe the social norms and expectations of one's physical appearance and what characteristics are valued within society. For example, in Western society, the ideal for women is to be thin. In addition to the cultural messages regarding one's physical self, individuals obtain messages from other people and groups such as friends, family members, peers, and strangers. These interpersonal interactions and social relations convey expectations, opinions and verbal and non-verbal messages regarding the body, and most often physical appearance. Specifically, teasing or other negative verbal feedback from friends or family can impact body image. Both physical characteristics, such as body fat, or pubertal development, and personality attributes such as self-esteem, the need for social approval, perfectionism, and public self-consciousness can also impact body image. Each of these historical influences (i.e., societal ideal, interpersonal relationships, and physical and personality characteristics) is primarily based on the events and experiences from the individual's development and socialization. Specifically, the meaning of one's physical appearance and body-focused events from an individual's childhood and adolescence help shape the development of body image throughout the lifespan which can affect

the current body image of an individual and thereby supporting its state- or trait-like quality (Cash, 2004a).

By contrast, proximal events and processes refer to immediate or on-going influences on one's body image (Cash, 2004a). Proximal events include activating events, such as body exposure (e.g., wearing revealing clothing), mirror exposure, social feedback or scrutiny, exercising, weighing oneself, mood states, and cognitive processing. Cognitive processing includes appearance-schematic processing (e.g., the processing of information about, and self-evaluations of, one's physical appearance), internal dialogues (e.g., positive or negative self-talk which is emotion laden, automatic thoughts, inferences, interpretations, and conclusions regarding one's body), and body image emotions (e.g., feeling regarding the body). Proximal events also include adjustive self-regulatory strategies and behaviours, which refer to thoughts and behaviours designed to cope with body image concerns. Cash (2004a) outlined three coping methods: avoidance behaviours (i.e., avoiding the threat to one's thoughts and feelings about the body such as not going to the beach to avoid wearing a bathing suit), appearance fixing behaviours (i.e., attempts to change or conceal a physical characteristic that is perceived as disturbing, such as exercising or wearing baggy clothing), and positive rational acceptance (i.e., actions that focus on positive self-care and self-talk and acceptance). Cash (2004a) suggested that the first two coping behaviours are associated with body dissatisfaction whereas those who are satisfied will typically engage in the third style of coping. All of these constructs may influence body image, by affecting body image attitudes.

1.4 *Body Image Evaluation*

The most commonly studied aspect of body image is body image evaluation, and specifically body dissatisfaction (Thompson & Gardner, 2004). As noted previously, evaluation of the body is most commonly addressed by examining discrepancies between current perceptions of the body and the ideal. Previous literature has examined the ideal body image that individuals in Western society strive to attain. For women, the ideal is thin, lean and toned, while for men the ideal is muscular, with broad shoulders and a narrow waist (Furnham, Badmin, & Sneade, 2002; McCabe & Ricciardelli, 2003). As suggested by Stanford and McCabe (2002), females typically wish to be smaller than their current size to meet that ideal, whereas males are split between a desire to increase and decrease their size. For women, what is important about this ideal is that it is almost impossible for the majority of them to achieve.

The literature on body image suggests that body dissatisfaction is a prevalent issue that affects both men and women, across the lifespan, and across different races and ethnicities. With regards to gender, women generally have a higher level of dissatisfaction when compared to men (Ip & Jarry, 2008). Thompson, Heinberg, Altabe, and Tantleff-Dunn (1999) examined a series of studies conducted for *Psychology Today* in 1972, 1985, and 1997 regarding the body image of men and women in the general population. Women's dissatisfaction with their bodies increased from 23% to 56% from 1972 to 1997. Women were most dissatisfied with their mid- and lower torso and their weight. Consistent with these findings, other researchers have also found that women are generally dissatisfied with their

appearance. For instance, Cash and Henry (1995) completed a survey of 803 women in the United States and found that half of the women had globally negative evaluations of their appearance. Specifically, the mid- and lower body, and overall shape and weight are the greatest sources of dissatisfaction for women (Cash & Henry; Muth & Cash, 1997). Given the pervasiveness of body dissatisfaction in North American women, Rodin, Silberstein, and Striegel-Moore (1985) coined the term 'normative discontent', which refers to the fact that so many women are dissatisfied with their bodies that it is considered to be normal to experience body dissatisfaction.

1.5 *Body Image Investment*

Body image investment has not been investigated within the literature as frequently as body image evaluation (Cash et al., 2004). However, the distinction between the two is important. For example, Muth and Cash (1997) suggested that women and men who experience similar levels of dissatisfaction but have high levels of investment in body image will experience more body image distress than individuals who are less invested. Therefore, it is important to assess both evaluation and investment of body image.

A central aspect of body image investment is appearance-related self-schemas (Cash, 2004a). Self-schemas refer to the cognitive structures that are used to process information related to the self (Cash et al., 2004). This information is obtained from personal history and social experiences, and can pertain to various domains, including physical appearance (Cash et al., 2004). Cash (2003) further divided body image appearance investment into two types based on whether they were considered to be adaptive or maladaptive: motivational salience of appearance, and self-evaluative

salience. Although both types refer to the importance placed on appearance, motivational salience refers to the extent to which people attend to their appearance and engage in appearance-management behaviours (e.g., grooming behaviours, clothing choice, and exercise and nutrition behaviours). Self-evaluative salience refers to the extent to which individuals define or measure themselves by their physical appearance, which they believe to be influential in their social and emotional experiences. Therefore, motivational salience is considered to be adaptive, while self-evaluative salience is thought to be more maladaptive (Cash, 2003). Subsequent research has shown that these two types of investment are distinct. For example, Cash (2003) reported that investment was related to perfectionism, global self-esteem, and eating disturbances. However, these constructs were more strongly correlated with self-evaluative salience than motivational salience. Similarly, Ip and Jarry (2008) found that women who were high in self-evaluative salience demonstrated a higher level of body image dissatisfaction and placed a higher level of importance on the current-ideal discrepancy after viewing thin images than women lower in self-evaluative salience.

1.6 *Correlates of Negative Body Image*

The issue of negative body image has received a great deal of attention in the literature. According to Stice (2002), body dissatisfaction is a risk factor for numerous potentially dangerous outcomes. For example, negative body image has been related to dieting, sedentary behaviours, excessive exercise, eating disorders such as anorexia nervosa and bulimia nervosa, negative affect, depression, and decreased self-esteem (for a review see Stice). In addition, social physique anxiety

has also been correlated to negative body image (Martin Ginis, Eng, Arbour, Hartman, & Phillips, 2005). Given these potentially negative correlates of poor body image, it is important to investigate factors that are related to body image.

1.7 *Non-modifiable Factors Influencing Body Image*

Several variables have been linked to body image. Some factors, including gender, age, and ethnicity, are not modifiable.

1.7.1 *Gender.* One non-modifiable factor that consistently is related to body image is gender. While body image concerns exist for both men and women, women typically report having a higher level of dissatisfaction than men (Davis & Cowles, 1991; Muth & Cash, 1997; Stanford & McCabe, 2002). However this difference could be attributed to the way in which body image dissatisfaction in males is assessed. Typically, body dissatisfaction is measured by assuming that people have a desire to be thinner or smaller (i.e., drive for thinness). For women, this is generally true, as most women report wishing that they were thinner (Furnham, Titman, & Sleeman, 1994; McCabe & Ricciardelli, 2001). However, whereas body image dissatisfaction in females is typically shown through a desire to lose weight, men are typically evenly split between a desire to gain and lose weight (Furnham et al., 2002; Stanford & McCabe, 2002). That is, some men wish to be smaller and lose weight, while others wish to be bigger, and gain muscle.

In addition to gender differences in dissatisfaction, other gender-related body image differences also exist. For example, women are more likely to engage in exercise as a weight loss method, and also place a higher level of importance on appearance as influencing their level of well-being compared to men (Davis &

Cowles, 1991; Stanford & McCabe, 2002; Tiggemann & Williamson, 2000). Further, weight is extremely important to women's body image. Stanford and McCabe (2002) found that body image and weight satisfaction were significantly correlated for girls; however, the same relationship was not apparent in boys.

In regards to body-related behaviours, Muth and Cash (1997) found that women exhibited more appearance-invested behaviours (e.g., grooming, diet, exercise) than men. Gender differences also exist with respect to dissatisfaction with specific body parts. Women typically show a desire to have smaller upper bodies, a substantially smaller mid torso, and a smaller lower body whereas men indicate a desire for a larger upper body, and smaller mid and lower body (Stanford & McCabe, 2002). Also, these authors found that women were dissatisfied with more parts of their body (e.g., mid-torso, hips, thighs, buttocks) compared to men, who were typically dissatisfied with their upper body, specifically chest and biceps.

1.7.2 *Age.* Differences in body image exist across the lifespan, and age-related changes to an individual's body image can occur throughout his/her development (Pruzinsky & Cash, 2004). However, it is evident that body image is an important issue throughout the entire lifespan.

1.7.2.1 *Childhood.* Body image concerns have been shown to exist in childhood (i.e., up to approximately 12 years of age), and children as young as six years old express body image concerns and dissatisfaction (Smolak, 2004). In elementary school children, approximately 40% of girls and 25% of boys indicate being dissatisfied with their body weight and shape (Smolak). Girls who are in late elementary school typically show higher levels of concern regarding overweight and

have a stronger desire to be thinner than younger girls. Similar to girls, young boys' body satisfaction decreases as they progress through elementary school (Smolak). However, the literature has not examined the direction of the dissatisfaction in children, which may affect the accuracy of the number of children who report being dissatisfied with their body image. Boys may demonstrate a desire to be larger (i.e., an increase in muscle mass) as opposed to expressing a desire to be thinner. Such a pattern has also been found in research conducted on adolescents (Furnham et al., 2002).

1.7.2.2 *Adolescence.* While it is evident that body image concerns exist in children, it begins to become a more critical issue during adolescence (i.e., approximately 13-18 years of age), in particular for girls. Levine and Smolak (2004) suggested that during adolescence, body image is an important aspect of an individual's psychological and interpersonal development, especially for girls. During adolescence body image concerns typically increase and the rates of social comparisons increase (Groesz, Levine, & Murnen, 2002; Levine & Smolak, 2004). The primary reason for this increase in negative body image in girls during adolescence is that the physical changes associated with puberty move girls further away from the ideal, whereas for boys, the physical changes move them closer. For girls, dissatisfaction with body image is typically centered on the mid- and lower torso (stomach, hips, buttocks and thighs), and approximately 40-70% of girls report dissatisfaction with two or more aspects of their body (Levine & Smolak, 2004).

1.7.2.3 *Young Adulthood.* The majority of the research on age-related changes in body image have been conducted with young adults, in particular college-aged students. Wharton, Adams, and Hampl (2008) examined the body weight perceptions and weight loss practices of college students. The authors found that half the sample of women reported attempting to lose weight, although only 28% of these individuals were classified as being overweight according to BMI. Approximately 12% of the participants had inaccurate body weight perceptions compared to their BMI results. With regards to weight loss practices, 72.3% reported exercising, 43% dieted to lose weight, and 37.7% used a combined method of diet and exercise. Finally, 12.3% used inappropriate methods (e.g., laxative use diet pills, and vomiting) in attempts to lose weight. These findings suggest that body weight plays an important role in college women's body weight perceptions and weight loss practices, and represent a high level of investment in body image. A second large scale study examining college women found that women demonstrated a higher level of body surveillance (i.e., watching oneself as though one were an observer) and dissatisfaction compared to men (Frederick, Forbes, Grigorian, & Jarcho, 2007).

With regards to body weight and shape, college-aged females report higher levels of dissatisfaction compared to males, and individuals who were overweight or obese according to BMI reported a desire to achieve an ideal weight that was lower than their current weight (Neighbors & Sobal, 2007). Finally, a study comparing mothers and their college age daughters found that both mothers and daughters reported not participating in physical activity due to appearance-related concerns (e.g., not going swimming to avoid wearing a bathing suit in public) and a desire to

be smaller than their current weight to achieve their ideal body image (Liechty, Freeman, & Zabriskie, 2008). Given these findings within the literature, body image concerns among college age women are a significant issue.

1.7.2.4 *Adulthood and Older Adulthood.* There is limited research that exists regarding body image and age related changes in older adults (Krauss Whitbourne & Skultety, 2004). As people age, many physical changes occur to the body that move them away from the ideal. For example, appearance changes (e.g., wrinkles, weight gain, and grey hair), and fitness, health, and functional abilities can all deteriorate, which may lead to negative body image. Research has suggested that in older women, dissatisfaction with appearance remains relatively constant over the lifespan (Krauss Whitbourne & Skultety; Streigel-Moore & Franko, 2004). However, the relative importance placed on physical appearance tends to decrease with age and the importance placed on health and physical functioning increases (Tiggemann & Williamson, 2000).

1.7.3 *Race.* Relatively little research has examined racial differences in body image. Cash and Henry (1995) found that differences in body image existed based on race in individuals living in North America. Specifically, African Americans had a more positive body image when compared to individuals of Anglo or Hispanic ethnicity. This finding was supported by Celio, Zabanski, and Wifley (2004), who suggested that African Americans have a wider range of acceptable shapes and typically have a larger ideal body size compared to Caucasian women. African American women also tend to report that being overweight is still attractive whereas Caucasian women typically do not share this belief (Cash & Henry, 1995; Miller et

al., 2000). Further, African American adolescents believe that personality traits and attitude are more important than physical characteristics (Celio et al.), indicating that there may be lesser importance placed on appearance in individuals from some racial backgrounds.

In an examination of body image of Asian-Americans, Kawamura (2004) found that Asian-American women showed similar levels of body dissatisfaction compared to Caucasian women, although the rates and prevalence of eating disorders were significantly lower than Caucasian women. Further, Caucasian females reported higher levels of body image dissatisfaction compared to their Asian and Hispanic counterparts (Frederick et al., 2007). However, it should be noted that the majority of studies that have looked at racial differences in body image have done so within the North American context.

1.8 *Modifiable Factors Influencing Body Image*

Each of the above factors is related to body image; however, they cannot be changed. Other factors, however, may be modifiable, and include family, peers, media, and exercise.

1.8.1 *Family.*

Family and peer influences on body image have received a considerable amount of attention within the literature. In childhood (up to approximately age 12), body image is influenced more strongly by family members compared to peers (Tantleff-Dunn & Gokee, 2004). However, as children move into adolescence (approximately age 13-18) this influence reverses, so that peer influences become increasingly more important to body image (Levine, 2004; Levine & Smolak, 2004).

Generally, parents influence body image through modeling (e.g., attitudes and behaviours regarding their own body image), encouragement of weight-related behaviours and attitudes, teasing, or the importance placed on their children's weight and appearance (Kearney-Cooke, 2004). According to Striegel-Moore and Kearney-Cooke (1994), parents are generally satisfied with their children's appearance, although as they age, parents report less positive evaluations of their children's physical appearance and health behaviours. Although there are generally no differences between mothers and fathers with regard to the parents' attitudes about their child's body image, mothers have a greater influence on daughters' body image than fathers (Pike & Rodin, 1991). Mothers tend to focus on their daughters' appearance, compared to that of their sons, on whom they focus more on athletic skills and functioning of the body (McCabe, Ricciardelli, & Ridge, 2006).

It has been found that mothers' eating symptoms and body dissatisfaction are significantly related to their college-aged daughters' eating symptoms and body dissatisfaction (Cooley, Toray, Chuan Wang, & Valdez, 2008). Further, mothers who pressured, criticized, or gave direct negative feedback to their daughters regarding body image issues and eating had daughters who reported figure dissatisfaction and eating symptoms (Cooley et al.).

Although little work has examined sibling influences, some research suggests that commentary related to the body, whether positive or negative, can lead to poorer body image (Rieves & Cash, 1996). One study that examined the influence of family, specifically sister pairs, found that sisters reported similar scores on measures of internalization of the ideal, body image dissatisfaction, disordered eating, and

parental modeling and pressure (Coomber & King, 2008). Further, sisters were as important as mothers as modeling agents, and sisters were considered to be equivalent to peers as a social comparison target. Finally, the authors found that sister modeling directly affected bulimic behaviours and dietary restriction (Coomber & King).

1.8.2 *Peers.* As noted above, during adolescence, peers become much more influential on body image compared to family (Tantleff-Dunn & Gokee, 2004). Studies on peer influences most often examine the effect of teasing and other verbal commentary (both positive and negative) and modeling of behaviours on body image and eating behaviours. Levine, Smolak, and Hayden (1994) suggested that a strong correlate of the drive for thinness and disturbed eating patterns was weight/shape related teasing and criticism by peers. In adolescence, girls often talk with peers regarding dieting, weight, shape, and appearance. They also engage in what is termed 'fat talk.' This type of talk is where girls voice their anxieties about being or becoming "fat" (Levine & Smolak, 2004). Levine and Smolak suggest that these conversations provide a context for learning and solidifying body image dissatisfaction. Race Mackey and La Greca (2008) found that adolescent girls' peer-group affiliations were a significant predictor of their weight control behaviours as the girls within each peer group reported similar weight control behaviours. Friendship groups often demonstrate similarities in body image concerns and dieting behaviours (Levine & Smolak, 2004; Paxton, Schutz, Wetheim, & Muir, 1999). Additionally, adolescent girls who have friends who engage in diet behaviours place more importance on these behaviours themselves and engage in the behaviour themselves (Race Mackey & La Greca, 2008).

It is important to note that peer influences during adolescence can impact body image throughout the lifespan. For instance, a cross-sectional study of women aged 18-58 who were diagnosed with a clinical eating disorder found that individuals who had been teased about their appearance during adolescence by their peers were significantly higher in body dissatisfaction in adulthood (Sweetingham & Waller, 2008).

1.8.3 Media. The pervasiveness of the ideal body image within the media in Western culture is evident (Frederickson & Roberts, 1997). The '*Psychology Today*' study found that 45% of females indicated that celebrities and models influenced their body image, and 50% felt insecure when they saw 'perfect looking' models, wanted to lose weight, and experienced negative feelings (Thompson et al., 1999). According to a study conducted by Martin and Kennedy (1993), adolescents engage in comparisons to celebrities or models more frequently than pre-adolescents. Further, adolescents who had a one time exposure to a highly attractive advertising model demonstrated higher comparison standards on physical attractiveness after viewing the images. However, it has been suggested that exposure alone may not be sufficient to impact body image, but rather the combination of exposure to, awareness of (i.e., recognition of the sociocultural ideals presented by the media), and internalization (i.e., the progressive process whereby interactions between the person and the outer world are replaced by inner representations of the self and body; Kearney Cooke, 2004) of the media's ideals has the most influence on body image (Tiggemann, 2004).

When examining the media's influence on body image, awareness and internalization of the ideal are important. One study found that girls who indicated having a greater awareness of the thin ideal believed it was more important for them to replicate the ideal body image (Murnen, Smolak, Mills, & Good, 2003). Further, girls who internalized the ideal liked how the ideal images looked, placed more importance on achieving the ideal, and believed that it was easy to achieve this ideal. Girls who scored higher on measures of body esteem were less likely to desire to look like idealized media images (Murnen et al., 2003). Tiggemann, Verri, and Scaravaggi (2005) found individuals who internalized the media images showed an increase in the frequency of consumption of fashion magazines in a sample of Australian and Italian women. However, only the Australian women showed a significant relationship between the frequency of reading fashion magazines and figure discrepancy and eating disorders, suggesting that some cultural differences may exist.

Fallon and Hausenblas (2005) found that individuals who viewed idealized media images experienced a decrease in body satisfaction, a decrease in self-esteem, an increase in body size distortion and an increase in mood disturbances and eating disorders symptoms. This finding is consistent with a review conducted by Groesz et al. (2002) regarding the media's influence on body image. They concluded that body image was significantly more negative after viewing thin idealized images compared to viewing average or plus size models, or inanimate objects.

1.9 *Body Image and Exercise*

One factor that has consistently been positively related to body image across the lifespan, for men and women, is exercise. In a qualitative review of the literature

on exercise and body image, Martin and Lichtenberger (2004) concluded that exercise consistently had a positive effect on body image. They further concluded that resistance training had a stronger influence on body image than other types of exercise, such as aerobic activity. However, subsequent to this review, three more recent meta-analyses have investigated this issue quantitatively.

Hausenblas and Fallon (2006), Reel et al. (2007), and Campbell and Hausenblas (2009) recently conducted meta-analyses investigating the influence of exercise on body image, as well as moderators (including study design, gender, age, and amount and type of exercise) of this relationship. Hausenblas and Fallon (2006) included 121 studies in their analyses, involving both correlational and experimental designs; by contrast, Reel et al. (2007) included only 35 studies that were published up to 1997, accounting for the discrepancy between the number of studies included in the two meta-analyses. Campbell and Hausenblas (2009) examined 57 intervention studies that included control groups. In general, these meta-analyses concluded that exercise has small to moderate positive effects on body image. The most commonly studied dimension of body image investigated in these studies was evaluation (i.e., satisfaction/dissatisfaction), followed by affective aspects of body image (e.g., anxiety). Fewer than 5% of the studies investigated body-related perceptions, investment, or behaviours. Across these dimensions several moderators were found to significantly affect the magnitude of this relationship.

The impact of the study design (correlational, experimental versus control group, and single group designs) on the relationship of body image and exercise was examined (Hausenblas & Fallon, 2006). The largest effect sizes of exercise on body

image were found in correlational studies (*ES* = 0.41), followed by experimental versus control (*ES* = 0.28), and single group designs (*ES* = 0.24; Hausenblas & Fallon). The authors concluded that regular exercisers had more positive body image than non-exercisers, exercisers had more positive body image than those in a control group following an exercise intervention, and people who participate in an exercise intervention have more positive body image following the intervention compared to before. By contrast, a second meta-analysis found moderate effect sizes, with no difference in the type of study design (*ES* = .47 for experimental-control group designs, *ES* = .45 for single group designs, and *ES* = .50 for correlational designs; Reel et al., 2007).

Several participant characteristics were investigated as potential moderators of the exercise-body image relationship. Hausenblas and Fallon (2006) found that gender was a significant moderator. For both experimental-control and single study designs, they found larger effects of exercise on body image for women compared to men. However, for correlational designs, they found larger effect sizes for men than for women. Reel et al. (2007) found larger effect sizes for those participating in single gender groups (i.e., all men or all women) compared to mixed-gender groups. Overall, it appears that exercise improves body image for both men and women.

In addition to gender, age as a modifying factor has also been investigated. Hausenblas and Fallon (2006) found greater effect sizes for adolescents compared to college-aged students, adults, and older adults (although only one experimental-control study investigated older adults) in experimental versus control, and single group designs, whereas correlational studies showed significantly smaller effects for

adolescents than any of the other groups. Reel et al. (2007) investigated just older adults versus all other age groups, and found smaller effect sizes for older adults. However, Campbell and Hausenblas (2009) found the largest effect sizes for adults and older adults. These results suggest that exercise improves body image regardless of age, although it may be more effective for some age groups.

In addition to participant characteristics, characteristics of the exercise itself were also investigated as potential moderating factors in the meta-analyses. One factor that consistently was found to be a moderator was intensity of exercise. Specifically, low intensity exercise programs showed significantly smaller effect sizes than strenuous or moderate intensity levels (Hausenblas & Fallon, 2006). Similarly, Reel et al. (2007) found strenuous activities to be associated with larger effect sizes than moderate intensity activities, although Campbell and Hausenblas (2009) found no difference between moderate and strenuous intensities.

Hausenblas and Fallon (2006) and Campbell and Hausenblas (2009) found no effect of other measures of the amount of exercise, such as frequency, duration, or length of program. Reel et al. (2007) found that the effects were strongest after a few sessions, but then lessened the longer the program lasted, whether based on duration of a session, frequency of sessions, or length of program. Further, Reel et al. found programs that involved a combination of supervised and self-guided exercise showed the largest effect sizes, followed by self-guided only and then all-supervised exercise. Finally, the comparison of an individual exercise program compared to a group program has been examined. Reel et al. found similar effects sizes for both the individual and group exercise programs, concluding that the effect of exercise on

body image does not depend on whether the exercise is done in groups or individually.

One other exercise-related factor that has been investigated is the type of activity. Hausenblas and Fallon (2006) concluded that participation in both aerobic and resistance exercise was associated with a more positive body image. They reported that programs that used a combination of aerobic and resistance training yielded larger effect sizes than either aerobic or resistance in both experimental-control and single-group designs. However, they found that in correlational studies, aerobic training was associated with the largest effect sizes. By contrast, Martin and Lichtenberger (2004) concluded in their qualitative review that resistance training showed the most positive results. Most recently, Campbell and Hausenblas (2009) found mode (aerobic, resistance or both) did not modify the effects of exercise on body image in intervention studies.

1.9.1 *Exercise Type and Body Image.* Within the literature, *aerobic* exercise has been shown to improve body image variables in college females. The exercise interventions using aerobic activity have generally used either a step or dance aerobics program, for programs lasting approximately 10 to 12 weeks in duration. In general, these aerobic interventions have consistently led to improvements in body satisfaction (Asci, 2002; Asci, 2003; Henry, Anshel, & Michael, 2006); decreases in social physique anxiety (Bartlewski, Van Raalte, & Brewer, 1996) and improvements in physical self-concept and body esteem (Asci, 2002, 2003; Bartlewski et al., 1996). Only one study indicated no improvements on body image variables after participation in an 8-week intervention; however, some methodological shortcomings

may account for this lack of findings (i.e., participants and study design; Asci, Kin, & Kosar, 1998).

Studies examining the influence of *resistance* training on body image in female college students have generally ranged from 6-15 weeks in duration. Resistance training interventions have shown increased body satisfaction (Depcik & Williams, 2004; Martin Ginis et al., 2005; Williams & Cash, 2001), decreased social physique anxiety (Martin Ginis et al.; Williams & Cash), improved emotional well-being (Tucker & Maxwell, 1992), and improved self-efficacy (Williams & Cash). Although the majority of studies indicated improvements after a 12-week intervention, one study found improvements after only 6 weeks of weight training (Williams & Cash).

Mind-body activities, such as yoga, have been growing in popularity in recent years. For instance, in Australia, it is the 13th most popular physical activity (not including walking), and more popular than Australian Rules football, dancing, and fishing. It is estimated that almost 3% of the population practices yoga, a number which may be higher when yoga as a therapy is included (Penman, 2008). In the United States, almost 7% of adults have indicated that they practice yoga, an increase of over 40% since the survey in 2002 (Yoga Journal, 2008). In addition, practitioners spent approximately $5.7 billion per year on yoga classes and products, an increase of 87% since 2004. Thus, this activity is growing rapidly as both a fitness and therapeutic modality across the world.

Yoga is promoted as an activity that can improve strength, flexibility, and balance, but that is equally beneficial for stress relief, self-acceptance, mood

improvements, and internal body awareness (Mayo Clinic, 2008). An important focus of yoga is breathing in order to increase calmness, reduce anxiety, and relieve stress (Mayo Clinic). However, despite the popularity and health benefits of yoga relatively little research has investigated these potential psychological benefits empirically. The majority of studies within the literature that have used yoga as an exercise intervention have examined its effectiveness in an eating disordered population or those with other clinical body image disturbances (Mitchell, Mazzeo, Rausch, & Cooke, 2007). Yoga has also been used as interventions for populations who are striving towards improving balance such as the elderly or those with osteoporosis (Crews, 2005). However, yoga has received almost no examination within the current literature in regard to its impact on body image, specifically when being compared to other types of exercise such as resistance training.

Anecdotally, practitioners have suggested that yoga can have a positive effect on body image. Boudette (2006) noted that yoga can have several benefits for patients with eating disorders, for whom body image disturbance is a criterion of the disease. She suggested that yoga could help eating disorder patients focus on internal body sensations rather than external aspects of the body, in particular appearance. She also reported that these patients often demonstrated an increase in body acceptance and body confidence following participation in yoga. However, these observations were in a limited group of individuals with clinical body image disturbances.

A series of studies investigated whether a comprehensive program, including yoga practice, could help prevent eating disorders in fifth grade girls (Scime & Cook-Cottone, 2008; Scime, Cook-Cottone, Kane, & Watson, 2006). This program was

designed to be an interactive approach to preventing eating disorders, in which girls completed personal journals, discussed topics such as body image, the influence of media, the thin-ideal, and self-esteem, and participated in a yoga class, guided visualization, and relaxation. Each session lasted approximately 90 minutes, over the course of 10 weeks. These studies found that following the program, girls experienced significant decreases in both the drive for thinness and body dissatisfaction, as well as bulimia symptoms (Scime & Cook-Cottone; Scime et al.). Although these results suggest that a program incorporating yoga may be beneficial for improving body image, it is not possible to distinguish the effects of yoga from the other aspects of the program.

The relationship between participation in different types of physical activities such as yoga and body image has received some investigation. Daubenmeir (2005) examined differences in body awareness, body responsiveness, body satisfaction, and self-objectification (the process whereby women come to internalize an outsider's perspective of physical selves; Prichard & Tiggemann, 2007) in three groups of women: yoga practitioners, aerobic exercisers, and non-exercisers. They found that yoga practitioners reported greater body awareness, body responsiveness, body satisfaction and less self-objectification than those in the other two groups, controlling for BMI.

In a similar study, Prichard and Tiggemann examined the relationship between exercise type, self-objectification and body image, in a fitness center environment. The participants for the study included 571 female fitness class participants, ranging in age from 18-71 years. The participants completed a

questionnaire package that included background information, exercise behaviour, reasons for exercise, self-objectification, body esteem, and disordered eating. Results indicated that the time spent on cardio activities (e.g., treadmill, rower, bike, and stepper) was positively correlated to self-objectification and eating disorder symptomology, and negatively associated with body esteem. However, participation in yoga was negatively associated with self-objectification. Further, the authors found that no relationship existed between the time spent weight training and any body image variables. In addition, participation in cardio-based activities was associated with appearance motives for exercise, while participation in strength training and yoga was associated with health and fitness reasons for exercise. However, these studies were correlational in nature, and therefore it is not possible to determine whether participation in aerobic activities leads to increases in body image disturbance.

Engelman, Clance, and Imes (1982) compared men and women in a group yoga class to those in group therapy on body esteem. They found that, compared to a control group, individuals who participated in a yoga group and group therapy had similar increases in positive feelings towards themselves; however only the yoga group demonstrated an improvement on positive body feelings (i.e., body esteem). These findings suggest that yoga has the potential to improve body image in a variety of individuals.

Yoga has also been compared to progressive relaxation in terms of its effect on body image. Cusumano and Robinson (1992) compared the effects of Hatha yoga and progressive relaxation on the short term psycho-physiological outcomes in 95

female Japanese students. The participants were assigned to a Hatha yoga condition or a progressive relaxation condition, and completed measures of physical self-efficacy and global self-esteem. The participants attended one yoga or relaxation session per week for three weeks. The physiological measures (i.e., heart rate, blood pressure) were completed before and after each of the three sessions, and the questionnaires assessing body image (e.g., physical self-efficacy, self-esteem) were administered one week prior to the start of the exercise sessions and at the end of the third session. Both treatments (yoga and progressive relaxation) were effective in lowering heart rate and blood pressure, in addition to increasing self-esteem, but there was no difference between the yoga and relaxation interventions. Physical self-efficacy did not change in either group. The authors attributed the lack of change to only having the participants exposed to three sessions of yoga, as the mastery of some yoga poses may take longer than three sessions. The results of this study suggest that yoga can have physical and psychological benefits. In general, there is some evidence that yoga may positively affect body image.

To date, no research has directly compared weight training and yoga effects on body image using an experimental design. Further, most studies have looked at the chronic effects of exercise on trait body image. However, it is important also to look at the acute effects of exercise, in particular on state body image.

1.10 *Body Image: Chronic Versus Acute Exercise Interventions*

Previous literature that has examined exercise interventions designed to improve body image have mainly focused on chronic (i.e., long term) exercise interventions as opposed to examining an acute (or single) bout of exercise. The three

meta-analyses (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Reel et al., 2007) examining exercise and body image reported effects based exclusively on chronic exercise and trait body image, although Hausenblas and Fallon initially intended to also examine the effects of acute exercise. Hausenblas and Fallon noted that because body image has both trait (i.e., characteristics of an individual that remain relatively stable across a variety of situations and contexts) and state (i.e., characteristics that exist within a particular situation or circumstance) characteristics. However, they also noted that as very few studies examined the impact of acute exercise (i.e., single session), it needs to be further examined.

1.10.1 *Acute exercise and state body image.* Because body image can be conceptualized as a state construct, it is important to look at factors that can change state body image. Factors such as food intake (Vocks, Legenbauer, & Heil, 2007), the exercise environment (Gammage, Martin Ginis, & Hall, 2004; Katula, McAuley, Mihalko, & Bane, 1998; Van Raalte, Cunningham, Cornelius, & Brewer, 2004), and viewing media images (Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005) can all impact state body image. For example, Vocks et al. had one group of women consume a milkshake while viewing a neutral movie while the control group only viewed the movie. They found that the women who consumed the milkshake reported higher levels of state body dissatisfaction, suggesting that the attitudinal component of body image can be influenced by food intake. Similarly, numerous studies have shown that viewing images of idealized bodies can lead to higher state body dissatisfaction and negative body image (Groesz et al., 2002).

In addition to food intake, aspects of the exercise environment may also impact state body image. Gammage et al. (2004) found that women who believed they would be exercising in tight fitting exercise clothing, while being videotaped close-up by a man reported higher levels of state social physique anxiety compared to women who believed they would be exercising in shorts and a t-shirt, and videotaped only as a group. Other studies have suggested that just imagining the exercise environment can increase state body image. Kruisselbrink, Dodge, Swanburg, and MacLeod (2004) had women imagine exercising in an all-female, all-male, or mixed-sex exercise class. The authors found that situational social physique anxiety was higher for women than men, and women indicated they would be more anxious in the all-male setting and would shorten their workout in that setting. A study conducted by Van Raalte et al. (2004) found that college students had significantly higher social physique anxiety after imagining themselves in the fitness center and dining hall compared to the library. A second study replicated this finding with a group of exercisers. In addition, the second study also found that females had significantly higher social physique anxiety than males. The results of these studies suggest that social physique anxiety can be manipulated through changing the environment (Gammage et al., 2004; Kruisselbrink et al.; Van Raalte et al.).

With respect to state body image and exercise, the aspect of body image that has received the majority of attention is social physique anxiety. A study conducted by Lamarche, Gammage, and Strong (2009) examined the effect of the presence or absence of mirrors on self-presentational efficacy and state social physique anxiety in women following a step aerobics class. The authors found that completing the

exercise class resulted in an increase in self-presentational efficacy and a decrease in state social physique anxiety. Lamarche and Gammage (2009) similarly examined whether the gender of the exercise leader impacted social physique anxiety in a resistance ball exercise class. However, they found that all participants (who were female non- or infrequent exercisers) reported lower social physique anxiety. These studies suggest that completing an exercise class was more important than the environmental characteristics (i.e., presence or absence of mirrors, leader gender) in improving state body image.

Within the current body image literature, the effects of acute exercise on body image variables has not been researched extensively, with McInman and Berger (1993) one of the few studies that has examined the effect of acute exercise on body image. This study examined the relationship between aerobic dance participation and changes in self-concept and mood in university aerobic dance participants and a non-exercise control group of university students. Following participation in a group aerobics class, there were significant improvements for the aerobic group on 10 of the 13 dimensions of self-concept, with the largest changes in general self-concept, physical appearance self-concept, and emotional stability self-concept. By contrast, the control group showed no significant changes on any dimension of self-concept. They also found that in regard to self-concept and social physique anxiety, individuals who engaged in the aerobics class demonstrated changes in their self-concept. The authors concluded that improvements in mood and self-concept were evident after a single 60-minute exercise class and further research into this area was warranted. They also suggested that factors such as the exercise environment, type of

exercise, and amount of exercise (e.g., frequency, intensity and duration of the exercise) could impact the effectiveness of acute exercise on psychological outcomes.

1.11 *Limitations to Extant Research*

Body dissatisfaction is prevalent within society, and multiple studies have examined the levels of body dissatisfaction that individuals experience (Cash & Henry, 1995; Muth & Cash, 1995; Thompson et al., 1999) and the resulting outcomes of negative body image (Stice, 2002; Martin Ginis et al., 2005). Differences in body image attitudes exist between genders (Davis & Cowles, 1991, Furnham et al., 1994; McCabe & Ricciardelli, 2001; Muth & Cash, Stanford & McCabe, 2002), across the lifespan (e.g., Krauss Whitbourne & Skultety, 2004; Levine & Smolak, 1998; Liechty et al., 2008; Neighbors & Sobal, 2007; Smolak, 2004; Wharton et al., 2008) and between various ethnic and cultural groups (Cash & Henry; Celio et al., 2004; Kawamura, 2004). Although the previous factors are not modifiable, other modifiable factors have been shown to improve body image variables. One modifiable factor is exercise, which has been shown to be related to body image variables. Various aspects of the relationship between exercise and body image have been examined within the current literature (for reviews see Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Reel et al., 2007). Exercise intervention programs typically use chronic exercise interventions (approximately 6-12 weeks in duration) with 2-3 sessions per week 45- to 60-minutes in length. However, limited research exists on the effect of acute exercise and state body image (Hausenblas & Fallon). Understanding the effect of acute exercise in body image is important as individuals may obtain the benefits and improvements on body image after one single exercise

session. Further, most experimental studies examining the effects of exercise on body image have used designs that take advantage of students enrolled in university activity courses for credit. This design limits the generalizability of the findings, and the conclusions that can be drawn. In addition, with regard to the type of exercise an individual engages in, aerobic and resistance training have shown to lead to improvements in a variety of body image variables, but limited research on the effect of yoga on body image exists (Prichard & Tiggemann, 2008). Since the type of activity may be a modifying factor in the relationship between body image and exercise, further understanding of this relationship is needed to be able to effectively design exercise programs targeted to improving body image.

CHAPTER TWO: RATIONALE, PURPOSE, & HYPOTHESES

2.1 *Rationale*

Body image is a multidimensional construct that encompasses both attitudinal dimensions (cognitive, affective, and behavioural) and perceptions regarding one's body (Cash et al., 2002). Several factors are related to body image, such as gender (Davis & Cowles, 1991; Stanford & McCabe, 2002), age (Furnham et al., 2002; Smolak, 2002) and race (Cash & Henry, 1995). However, these factors cannot be changed. One way of positively influencing body image that has been well documented within the literature is exercise. In fact, Fisher and Thompson (1999) found that exercise therapy was as effective in treating body image disturbances as cognitive behavioural therapy. In general, exercise is an effective method of improving body image in men and women, across the lifespan (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Reel et al., 2007).

Although Martin and Lichtenberger (2004) suggested that exercise interventions are a feasible way to improve body image, the evidence regarding what type of exercise may be most effective is mixed (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Reel et al., 2007). Further, mind-body activities such as yoga, which are becoming a popular type of exercise, have received virtually no attention in terms of their impact on body image. A recent correlational study examined aerobic, resistance, and yoga-based exercise classes and their relationship to body image outcomes (self-objectification, body esteem, and disordered eating). The results of this study showed that time spent on cardio activities was positively associated with disordered eating and negatively associated with body esteem

(Prichard & Tiggemann, 2008). Participation in yoga-based classes showed a negative relationship with self-objectification, and no significant relationships existed between resistance-based classes and body image variables (Prichard & Tiggemann). In addition, Hausenblas and Fallon suggested that, although there is much evidence supporting the effectiveness of chronic exercise on trait body image concerns, almost no evidence exists examining the effectiveness of acute exercise sessions on state body image concerns. Preliminary evidence suggests a single exercise session can have a positive effect in state body image (Lamarche et al., 2009; Lamarche & Gammage, 2009; McInman & Berger, 1993). This issue is important, because, if true, it is possible that the outcomes of a single experience in an exercise setting (e.g., feeling negatively about one's body or feeling proud of one's body) may impact future behavior and motivation to continue participation in physical activity.

2.2 *Statement of the Purpose*

The general purpose of the present study was to examine the effects of two types of acute exercise on state body image attitudes. Specifically, the two types of acute exercise sessions were group fitness classes, including resistance training and a mind-body yoga activity. This study examined which, if either, of the two types of exercise were most effective at reducing body image concerns.

The following research questions were addressed in the current study:

1. Do body image attitudes (i.e., state body image satisfaction, state social physique anxiety, appearance orientation) improve following a single resistance or yoga exercise class?

2. Which type of exercise class (resistance or yoga) is most effective at improving these body image attitudes?

2.3 *Hypotheses*

The following hypotheses were investigated: Body image attitudes (state body image satisfaction, state social physique anxiety, appearance orientation) would improve after a single resistance or yoga-based exercise class. There is limited evidence examining the effect of acute exercise, as the majority of the literature examined chronic exercise programs. Given this lack of information regarding acute exercise, the rationale is based mainly on the positive influence of chronic exercise programs (Campbell and Hausenblas, 2009; Hausenblas & Fallon, 2006; Reel et al., 2007), and the limited evidence suggesting acute exercise can influence state body image (Lamarche et al., 2009; Lamarche & Gammage, 20009; McInman & Berger, 1993). Although less research has examined the influence of exercise on investment, motivational salience, which is considered to be a more adaptive form of investment, is linked to the performance of health behaviours (Cash, 2003). Therefore, it was hypothesized that exercise would increase this adaptive form of investment.

1. Although it was hypothesized that all the classes would result in improvements in body image attitudes, it was hypothesized that the mind-body yoga-based classes would lead to greater improvements in body image than the resistance exercise class. Daubenmeir (2005) found that yoga practitioners reported greater body awareness, body responsiveness, body satisfaction and less self-objectification than non-yoga counterparts. Similarly, Pritchard and Tiggemann (2007) found that participation in yoga was

negatively associated with self-objectification and was associated with participating in exercise for health and fitness reasons as opposed to appearance based reasons. Finally a study by Dittmann and Freedman (2009) found positive correlations between body responsiveness and body satisfaction and found that a high level of body responsiveness was associated with greater body awareness in individuals who practiced yoga. Given these findings it was hypothesized that yoga would show greater improvements in body image attitudes compared to participation in the resistance class.

CHAPTER THREE: METHODOLOGY

3.1 *Participants*

A total of 40 female undergraduate and graduate students were recruited from a university population. Women were selected for the present study for several reasons. Women generally have a higher level of body dissatisfaction when compared to men (Ip & Jarry, 2008), in addition to having higher levels of SPA. Further, females typically engage in fitness classes more often than males, and therefore using only female participants increased the ecological validity of the study. Women who were non- or infrequent exercisers (i.e., who had engaged in exercise two or fewer times per week in the last 6 months) were recruited for participation in the study. The data were collected at two separate points in time, one in the winter term and one in the following fall term. Participants were excluded from the study if they were physically unable to participate in the exercise classes used in the study (resistance training and yoga) or were regular exercisers. The participant's physical activity level was screened in order to ensure that the participants met the participation requirements of being non/infrequent exercisers (2 or fewer times per week). Any participant who indicated exercising more than twice per week was excluded from further analysis. A total of 5 cases were deleted because the participant did not meet the participation criteria of exercising two or fewer times per week. Two cases were deleted as the participant did not attend the second class. In addition, one group (3 participants) was not used. This group was the first class and was used as a trial of the class design, as it included a confederate as one of the participants, to ensure that it was appropriate for beginners.

The participants for the current study had a mean age of 19 years old (*SD*±1.87), mean height of 65 inches (*SD* ±2.54), mean weight of 142lbs (*SD* ± 24.51), and a mean BMI of 23.5 (*SD* ± 3.64). Additionally, the participants were largely recruited from the university psychology pool and therefore came from a variety of faculties across campus.

3.2 *Measures*

Participants completed a series of questionnaires at their initial exercise session (see Appendices B, C, and D for all questionnaires): demographics, Physical Activity Readiness Questionnaire (PAR-Q; Canadian Society for Exercise Physiology, 2002). Pre-exercise measures and post-exercise measures were completed prior to and following each of the two exercise sessions. Pre-exercise measures consisted of: the Body Image State Scale (BISS; Cash et al., 2002), Social Physique Anxiety Scale – State (SPAS-S; Kruisselbrink et al., 2004), and the appearance orientation subscale from the Multidimensional Body Image Self-Relations Questionnaire (MBSRQ- AO; Cash, 2000). The post exercise measures consisted of the same questionnaires as the pre-exercise questionnaires, with the additional inclusion of Borg's (1970) Rating of Perceived Exertion.

3.2.1 *Demographic Variables.* Age, height, weight, major and current physical activity behavior were self-reported by the participants. For physical activity behavior, the participants were asked to indicate how many times per week they exercised on average in the past 6 months, and the three types of activities in which they most commonly engaged. The participants were asked if they had participated in group exercise prior to the study and if so, in what type of group exercise they

engaged, as well as how many times they had participated in a group exercise class in the last 6 months.

3.2.2. *Physical Activity Readiness Questionnaire (PAR-Q, Canadian Society for Exercise Physiology, 2002)* The PAR-Q requires the participants to answer seven "yes" or "no" questions regarding their current health status. The PAR-Q was used to determine if the participants were able to safely participate in the physical activity requirements of the present study. Participants who answered "no" to all questions were able to participate in the study, while those who answered "yes" to any question were excluded from further participation in the study.

3.2.3 *Body Image States Scale (BISS; Cash et al., 2002).* Although body image is typically examined as a trait characteristic that is stable across various contexts, there is evidence that suggests that body image may be contextually and temporally dependent (Cash et al., 2002; Rudiger et al., 2007). The BISS scale was developed by Cash et al. (2002) to assess current (i.e., state) body image. It is made up of 6 items examining the following domains of body image experiences: dissatisfaction/satisfaction with one's overall physical appearance, body shape and size, and weight; feelings of physical attractiveness/unattractiveness; current feelings regarding one's looks relative to how one usually feels; and evaluation of one's appearance relative to how the average person looks. Each item is rated on a 9-point Likert scale, with higher scores representing more positive body image. Reliability for pre- and post- class BISS scores were adequate (Cronbach's alpha's: pre-resistance= .85; post-resistance= .86; pre-yoga= .83; post-yoga= .82).

3.2.4 *State Social Physique Anxiety Scale (SPAS-S; Kruisselbrink et al., 2004).* The SPAS measure the situational specific level of anxiety individuals may have regarding their bodies being evaluated by others. Participants rate each of the 9 items on a 5-point Likert scale ranging from 1 (*not at all characteristic of me*) to 5 (*extremely characteristic of me*) to indicate the level of social physique anxiety they are experiencing at that time. Higher scores represent greater social physique anxiety. Reliability for pre- and post- class SPAS-S scores were adequate (Cronbach's alpha's: pre- resistance = .91; post-resistance = .92; pre-yoga = .92; post-yoga = .92).

3.2.6 *Multidimensional Body Image Self Relations Questionnaire (MBSRQ; Cash, 2000).* The MBSRQ is a 69-item measure of body image investment (the level of importance an individual places on body image) and evaluation (the level of satisfaction or dissatisfaction with one's body image) across several domains (i.e., health, appearance, fitness, and illness). This measure contains 10 subscales, only the appearance orientation subscale was used for the purposes of the current study. The appearance orientation subscale examines the extent to which an individual is invested in, or the importance she places on, her appearance. It comprises 12 items, each rated on a 5-point Likert scale. Higher scores indicate the individual places greater importance on how she looks, pays attention to her appearance more, and engages in grooming behaviours. Therefore, this measure of investment is consistent with Cash et al.'s (2002) conception of motivational salience, or adaptive investment. Lower scores indicate that the individual is apathetic regarding her appearance, does not place much importance on her looks, and does not expend much effort on grooming behaviours. Reliability for pre- and post- class MBSRQ-AO scores were

adequate (Cronbach's alpha's: pre- resistance = .81; post-resistance = .83; pre-yoga = .86; post-yoga = .87).

3.2.6 *Rating of Perceived Exertion (RPE; Borg, 1970).* Borg's scale is a widely used scale to assess how hard an individual feels (s)he is working when participating in physical activity or exercise. Participants rate their level of exertion from 0 (*no exertion*) to 10 (*maximum exertion*). The RPE scale for the current study was used as a manipulation check to ensure that the participants were working at a consistent effort across the classes.

3.3 *Procedures*

Ethics clearance was obtained from Brock University's Research Ethics Board (see Appendix E). Recruitment of the participants was done through the use of posters placed around the school and announcements in academic classes (see Appendix F). Individuals interested in participating in the study contacted the researcher through email. After being contacted by participants, the researcher provided an overview of the purpose of the study and the inclusion and exclusion criteria for participation was explained. At this time, any questions from participants were answered. Participants who agreed to take part in the study and met the participation requirements were told the time and date of the first class and asked to attend that class in the Exercise Intervention Laboratory (Welch Hall 16) on campus. Participants were instructed to wear clothing that was appropriate for exercise (comfortable clothes and running shoes).

When the participants arrived at the laboratory, they were asked to provide informed consent (see Appendix G). They then completed the PAR-Q. Participants

who answered "yes" to one or more of the questions on the PAR-Q were excluded from further study. If participants received clearance for participation in physical activity, they were provided with a demographic questionnaire. After completion of the first questionnaire, participants were asked to gather the required pieces of exercise equipment needed for the particular class type. For the resistance class, the participants self-selected the free weights they wished to use with the assistance of the instructor. If they asked for assistance, the instructor recommended 3 or 5 pound weights, and they were told they could take both if they preferred. Once the equipment for the exercise class had been gathered, the participants found a place on the exercise floor and were given the pre-exercise body image measures to complete. Once all participants completed the pre-exercise measures, the exercise class followed. Upon completion of the class, the post-exercise body image measures were completed by the participants. All measures (pre- and post-exercise) were counterbalanced to avoid the potential of order effects. Participants were told the date and time of the next session, which occurred one week later. At the second class, participants followed the same basic protocol, and completed the same pre- and post-exercise measures, but performed the other type of exercise class. Upon completion of the second class, participants were thanked for their participation. At the completion of the two exercise classes, the participants were debriefed and completed a summary of results request form (if desired).

3.3.1 *Exercise Classes.* Each of the classes was designed by the faculty advisor and primary investigator, who are both certified fitness instructors. Each of the classes had 6-8 participants and the same participants completed each type of

exercise class together. The order of the two classes for each group of 6-8 participants was randomized. The classes were 30 minutes in length, each consisting of a 5-minute warm up, 20 minutes of weight training or yoga, and a 5-minute cool down and stretch. Feedback from the instructor was limited to instructional cues, with no motivational cues being provided for either of the class types. The physical exercise environment, music, exercise leader, exercise leader's clothing, feedback, and exercise routine (for each class type) were identical. The only difference was the type of exercise that was completed that session. All the classes were designed to be suitable for beginner exercisers.

3.3.1.1 *Resistance Class.* The weight training class emphasized the use of free weights and body weight to improve muscular strength and endurance. A 5-minute warm up of simple choreographed exercises was used to give the participants an adequate warm-up. The remainder of the class time focused on free weight exercises, targeting each major muscle group with one exercise (e.g., biceps: bicep curls with dumbbells; chest: chest press with dumbbells). The weight training class used a series of discrete exercises designed to result in muscle fatigue. Finally, a 5-minute cool-down and stretching component was conducted at the end of the class, covering all the major muscle groups that were used during the class.

3.3.1.2 *Yoga-Based Class.* The yoga-based class placed an emphasis on using body weight and a series of static balance poses to improve balance and link deep breathing techniques to movement. The emphasis was placed on breathing, and the connection of the mind and body throughout the class. All the poses that were used were beginner poses, and modifications were provided for the participants to ensure

that they were able to complete the class. A 5-minute warm up at the beginning of the class and a 5-minute cool-down including stretching at the end of the class were used.

3.3.2 *Leader Characteristics and Qualifications.* The same exercise leader conducted all classes. The exercise leader for the study was the primary investigator for the study. The exercise leader was a female instructor who was 24 years old, 69 inches tall, and 130 lbs. She is certified through CanFitPro as a Personal Training Specialist and Fitness Instructor Specialist, in addition to being a certified spinning instructor through Cycle Reebok. She has worked for Recreation Services within the University for the past 4 years. In addition to being involved in the health and fitness industry, she has been a varsity swimmer for 4 years.

3.3.3 *Checklist for Class Consistency.* A detailed outline and script was created for each of the class types and a checklist (see Appendix H) was developed to evaluate the consistency between the classes of the same type, to ensure cuing for all classes was instructional only, and to ensure class lengths were consistent. The outline included the order of choreography and exercises, the number of repetitions performed, the instructional cues the instructor used during the class, and the starting and finish time for the class. During each class, a research assistant (out of view from the participants) used this checklist to confirm that each exercise was completed in the correct order and with the correct number of repetitions. The researcher recorded an error if an exercise was missed or performed incorrectly, if a cue was missed, or if additional cues were added in. Each class was given a mark, which was converted into a percentage in order to examine the consistency between the classes.

3.3.4 *Manipulation Training.* After completing the design of the exercise classes, the exercise leader practiced leading each class in a variety of situations. Both class types were practiced to ensure that the exercise order, level of intensity, duration and overall class design were effective and appropriate for non/infrequent exercisers. The classes were practiced in front of a group of individuals of similar fitness levels and abilities to the potential participants until consistency between the classes was reached. Once the class structure and design was finalized, the checklist was created and the classes were taught in front of the faculty advisor. The checklist was used during these classes to ensure that the classes were taught with consistency. One final practice class of leading the classes of non/infrequent exercises was completed to ensure consistency.

3.4 Design

A pre- post repeated measures design was used for the study. Each participant participated in both types of exercise classes. The order of classes for each group of participants was counterbalanced to eliminate order effects. Participants completed state body image measures twice for each class: immediately prior to the class, and immediately following the class.

CHAPTER 4: RESULTS

4.1 Data Screening

The data were entered into the quantitative data analysis software program Statistical Package for the Social Sciences (SPSS) version 17.0. The data were collected at two separate points in time, one in the winter term and one in the following fall term. A series of independent sample t-tests were used to compare participants from the two time periods on demographic, physical activity, and dependent variables. All t-tests resulted in p values greater than .05, suggesting participants from the two time periods were sufficiently similar. Therefore all data from both time periods were collapsed into a single group.

4.2 *Treatment of Missing Data*

The data were screened for data entry errors and missing values by examining univariate frequencies. Visual inspection of the data was used to ensure that the missing values showed no consistent pattern and could be considered to be random. If a participant missed an entire questionnaire, she was deleted from that analysis. If a single item was missing from a questionnaire, mean substitution of the participant's subgroup was used (Tabachnick & Fidell, 2007). One case was deleted from any analysis using BISS subscale and one case was deleted from the analysis using the MBSRQ-AO subscale as a participant missed the entire scale. Finally, mean substitution was used in two cases where the participant missed a single question on one of the scales.

4.3 *Reverse Coding and Subscale Score*

Where appropriate, items were reversed coded. For each study variable, the mean score was calculated to serve as the subscale score where appropriate.

4.4 *Assumptions of Data Analysis*

4.4.1 *Univariate and Multivariate Outliers.* The data were screened for univariate and multivariate outliers. To check for univariate outliers, histograms were created and visually inspected (Tabachnick & Fidell, 2007). The histograms did not show any potential univariate outliers. Univariate outliers were also assessed using standardized scores (z-scores). For standardized scores greater than 3.29, the score was considered as a potential outlier (Tabachnick & Fidell), however all scores were less than 3.00 and therefore there was no evidence of univariate outliers.

Next, multivariate outliers in the data were screened using Mahalanobis' distance (the distance of a case from the centroid of the remaining cases, where the centroid is the point created at the intersection of the means of all the variables for the research questions of interest; Tabachnick & Fidell, 2007). According to Tabachnick and Fidell, a conservative estimate for a case being an outlier is $p < .001$ for the χ^2 value (with degrees of freedom equal to the number of variables). Mahalanobis' distance was calculated for all the variables and evaluated against χ^2 (15) = 37.697, p = .001. All values were less than 30.00, therefore providing no evidence of multivariate outliers.

4.4.2 *Normality of Sampling Distribution: Skewness and Kurtosis.* To assess normality, skewness and kurtosis values by class type for all the variables were assessed. Skewness examines the symmetry of the distribution. A distribution that is

skewed has a mean that is not at the center of the distribution. Kurtosis refers to the peakedness of the data (either too peaked or too flat). In a normal distribution the skewness and kurtosis values should be zero. The skewness and kurtosis values that were obtained were tested against a null hypothesis of zero using a *z* distribution (Tabachnick & Fidell, 2007). The *z* distribution was compared to a conservative alpha level (.01), which is used for a small to moderate sample size (Tabachnick & Fidell). All *z*-scores were non-significant for skewness and kurtosis. Therefore, there was no evidence that data were not normally distributed.

4.4.3 *Linearity.* According to Tabachnick and Fidell (2007), linearity is the assumption that two variables are related to each other in an approximately straight line relationship. The assumption of linearity was assessed by examining the bivariate scatterplots by class for all possible combinations of the variables of interest. Using a visual inspection of the scatterplots gives evidence if any other relationship other than linear exists. The bivariate scatterplots were found to have a linear relationship between all possible combinations of variables.

4.4.4 *Multicollinearity and Singularity.* Multicollinearity exists when two variables are highly correlated (for example, .90 and above) and singularity occurs when variables within the data are redundant (Tabachnick & Fidell, 2007). Bivariate correlations were investigated to assess possible multicollinearity. Any correlation approaching .90 was investigated (Tabachnick & Fidell). The only instances of correlations above .90 occurred for pre-post results of each subscale, which were expected to be highly correlated.

4.5 *Manipulation Checks*

4.5.1 *Class Consistency.* The exercise classes were evaluated for consistency using the class checklists. Each class was given a mark indicating the total number of correct exercises and cues performed, which was converted to a percentage of the total exercises and cues. The resistance class was scored out of 36 possible cues/exercises and the yoga class was scored using 126 possible cues/exercises. The resistance classes had a mean score of 96.9% correct and ranged from 88.8%-100%. The yoga classes had a mean score of 97.2% correct, with a range of 90.4%-100%. Additionally, the classes were assessed for the duration of each of the classes. The mean duration of the yoga classes was 27.3 minutes ($SD \pm 4.4$), and the resistance class was 31.9 minutes ($SD \pm 3.35$). The yoga classes ranged in duration between 26 minutes to 41 minutes, and the resistance class ranged from 30 minutes to 41 minutes.

4.5.2 *Rating of Perceived Exertion.* A manipulation check was completed to ensure that participants perceived themselves to be working equally hard across the two class types. A paired sample t-test was conducted using RPE as the dependent variable and class type as the independent variable. The mean RPE for the yoga class was 3.97 ($SD \pm 2.31$) and the mean RPE for the resistance class was 4.29 ($SD \pm 2.13$). These scores would be towards the middle of the perceived exertion scale (i.e. somewhat strong exertion), and as the class was designed for individuals who had never exercised before these scores were expected. The paired sample t-test showed that the means were not significantly different, suggesting that the

participants found themselves to be exerting the same effort across both class types (t (46) = 1.04, p = .31).

4.6 *Hypothesis Testing*

Three separate ANOVA's were conducted as the scales were shown to not be highly correlated. The decision to use separate ANOVAs rather than a single MANOVA was made for statistical and conceptual reasons (Tabachnick & Fidell, 2007). The correlations between subscales by class type were generally low, with the exception of BISS and SPAS. The correlations between the BISS and SPAS scales pre resistance was -.70, pre-yoga was -.71, post resistance was -.64, and post yoga was -.69. The correlations between the SPAS and MBSRQ-AO were for pre resistance was .24, pre yoga was .35, post resistance was .25 and post yoga was .21. The correlations between the BISS and MBSRQ-AO were for pre resistance -.25, pre yoga was -.14, post resistance was -.01, and post yoga was -.16. Further, although the three measures assessed different dimensions of body image, they are conceptually distinct.

4.6.1 *Descriptive Statistics.* Descriptive statistics for the entire sample for each of the two conditions for each variable including pre- and post- BISS, SPAS, MBSRQ-AO, and RPE are presented in Table 1.

4.6.2 *MBSRQ- Appearance Orientation Subscale.*To investigate whether participation in either the resistance or yoga class was associated with changes in appearance orientation, a 2 (time: pre-exercise vs. post-exercise) x 2 (class type: resistance vs. yoga) repeated measures ANOVA was conducted. There was no significant effect for the time by type interaction (F (1, 50) = .33, p > .05, η^2= .007),

for time (F (1, 50) = 1.29, p > .05, η^2 = .025) or class type (F (1, 50) = .58, p >.012, η^2 = .012).

4.6.3 *Body Image State Scale.* To investigate whether participation in either the resistance or yoga class was associated with changes in body satisfaction, a 2 (time: pre-exercise vs. post-exercise) x 2 (class type: resistance vs. yoga) repeated measures ANOVA was conducted. There was a significant time by type interaction (F (1, 50) = 6.38, p = .015, η^2 = .113). There were also significant main effects for time (F (1, 50) = 8.35, p< .01, η^2 = .14) and class type (F (1,50) = .72, p< .05, η^2 = .014) . Figure 1 presents the results of the significant interaction.

To investigate the significant interaction, two follow-up paired t-tests were conducted on the BISS scores. For the comparison of the pre-resistance vs. pre-yoga, the results showed that there was no significant difference in the participants' level of body satisfaction prior to each of the class types (resistance and yoga) (t (50) = .85, p = .398). For the comparison of the post-resistance vs. post-yoga BISS scores, significant differences were found (t (50) = -2.11, p = .04). The means and standard deviations for post resistance (M= 5.21, SD ± 1.53) and post yoga (M= 5.5, SD ± 1.44) indicated that participants had significantly higher body satisfaction following the yoga class compared to the resistance class.

4.6.4 *Social Physique Anxiety Scale- State.* To investigate whether participation in either a resistance or yoga class was associated with changes in SPAS-S, a 2 (time: pre-exercise vs. post-exercise) x 2 (class type: resistance vs. yoga) repeated measures ANOVA was conducted. There was a significant time by type

interaction (F (1, 50) = 7.22, p = .01, η^2 = .126). There were also significant main effects for time (F (1, 50) = 21.22, p < .01, η^2 = 29) and class type (F (1, 50) = 4.14, p < .05, η^2 = .077). Figure 2 presents the results of the significant interaction.

To investigate the significant interaction, two paired t-tests were conducted on the SPAS-S scores. For the comparison of the pre-resistance and pre-yoga, the results showed that there was no significant difference in the participants' SPAS-S prior to each of the class types (resistance and yoga) (t (50) = -.21, p = .833). For the comparison of the post-resistance versus post-yoga SPA scores, significant differences were found between the two class types (t (50) = 3.01, p = .004). The means and standard deviations for post resistance (M= 2.67, SD ± .98) and post yoga (M= 2.44, SD ± .91) indicated that participants had significantly lower SPAS-S following the yoga class compared to the resistance class.

CHAPTER 5: DISCUSSION

5.1 *Purpose*

The purpose of the current study was to examine the effects of exercise type (resistance and yoga) delivered in a single group exercise class on state body image attitudes. This study examined which, if either, of the two types of exercise was most effective at reducing body image concerns. The following hypotheses were investigated:

1. Body image attitudes would improve (i.e., increase state body image satisfaction and appearance orientation and decrease state social physique anxiety) after a single resistance or yoga-based exercise class.
2. Although it was hypothesized that both the classes would result in improvements in body image attitudes, it was hypothesized that the yoga-based class would lead to greater improvements in body image (i.e., greater state body image satisfaction and lower state social physique anxiety and appearance orientation than the resistance exercise class).

The hypotheses of the current study were partly supported, with participation in the yoga class associated with decreases in social physique anxiety and increases in body satisfaction, but no change in appearance orientation. By contrast, participation in the resistance class was associated with no changes in any of the study variables.

5.2 *Descriptive Data*

Prior to beginning either class type, pre-measure scores for both the resistance and yoga class were similar for each of the measures (SPAS-S, BISS, and MBSRQ-AO). Further, the pre-class scores were consistent with previous research in similar

samples (Gammage et al., 2004; Lamarche & Gammage, 2009) and fell around the midpoints of the scales. Thus, although these participants did not have extreme body image concerns, they did demonstrate a moderate amount of body image concern.

It should be noted that the participants in the present study were drawn primarily from the psychology research participant pool within the university. These individuals therefore participated in the study, at least in part, for academic requirements. By contrast, many previous studies examining the impact of exercise on body image have utilized participants who are already enrolled in university fitness activities course (Asci, 2002, 2003; Asci et al., 1998). It is likely that individuals enrolled in a fitness class may have lower body image concerns, and greater interest in participating in exercise. Participants in the present study were free to choose in which studies to participate. Thus, their participation in the current study indicates that they had at least some interest in participating in the physical activity component of the study.

5.3 *Social Physique Anxiety*

The current study found that social physique anxiety was significantly reduced following participation in the yoga-based class, consistent with the hypothesis, with no change in social physique anxiety following the resistance class. The reduction in social physique anxiety following the yoga class was partly consistent with previous research examining the effects of acute exercise on social physique anxiety, which has shown that an acute exercise session can reduce social physique anxiety. Studies by Lamarche and Gammage (2009) and Lamarche et al. (2009) found similar results, with a reduction in state social physique anxiety following acute exercise classes.

Lamarche and Gammage (2009) found that non/infrequent college females who participated in a resistance ball exercise class reported significantly lower social anxiety and state social physique anxiety post-exercise, regardless of whether it was taught by a male or female instructor. Lamarche et al. (2009) found similar results following a step aerobics class, also with female non/infrequent exercisers. Specifically, reductions in state social physique anxiety were reported following a single step aerobics class, whether participants exercised in a room with mirrors or no mirrors visible. These authors suggested that participation in exercise, regardless of variables such as leader gender and exercise environment, may reduce the level of social physique anxiety individual's experience following exercise. They also found that these two types of exercise had similar beneficial effects on state social physique anxiety. However, the current study found only yoga, and not a resistance class, led to decreases in state social physique anxiety.

Although no research has examined the effect of a single yoga-based class on body image previously, research comparing regular yoga participants to those who regularly engage in other types of exercise, or to non-exercisers, has indicated the beneficial effects of yoga on body image (Daubenmeir, 2005; Dittmann & Freedman, 2009; Prichard & Tiggemann, 2007). For example, Daubenmeir (2005) found that yoga improved body awareness which resulted in lower self-objectification, greater body satisfaction, and lower eating disorder attitudes. A study by Dittmann and Freedman (2009) found positive correlations between body responsiveness and body satisfaction and found that a high level of body responsiveness was associated with greater body awareness in individuals who practiced yoga. Prichard and Tiggemann

(2007) similarly found that participation in yoga was negatively associated with self-objectification, as well as health and fitness reasons for exercise, rather than appearance-oriented reasons.

There are several potential explanations for why state social physique anxiety decreased following the yoga-based class. Yoga practice requires one to move the body mindfully through a series of poses with the focus placed on being aware of internal body sensations, rather than using external cues (e.g., mirrors) to make proper movements (Daubenmeir, 2005). Therefore the goal of yoga is to create a mind-body link where people are aware of how their body feels rather than what it looks like. Some studies have suggested that this link does occur, with yoga practice associated with higher body awareness (Daubenmeir, 2005; Dittmer & Freedman, 2009; Rani & Rao, 1999). Given that state social physique anxiety is the anxiety individuals have regarding their bodies being evaluated by others, yoga's focus on the mind-body connection as opposed to the body-oriented focus of other forms of exercise may be the reason for the decrease in post-yoga. By drawing the focus off of the appearance of one's body, an individual may be less inclined to focus on the perceptions of her body by others, and feel less anxious about these potential perceptions.

A second explanation for the beneficial effects of yoga on state social physique anxiety may be related to the fact that yoga has been shown to reduce self-objectification (Daubenmeir, 2005; Prichard & Tiggemann, 2007). Self-objectification is defined as a form of self-consciousness, which leads to a vigilant monitoring of the body's outward appearance as if from an observer's perspective (Frederickson & Roberts, 1997). It has been shown that repeated states of self-

objectification result in various negative psychological outcomes, including a diminished awareness of internal states (bodily sensations and emotions). Self-objectification has been associated with greater body shame, disordered eating symptoms, depression, and anxiety. Self-objectification and social physique anxiety are both self-conscious in nature, and involve viewing oneself from a third person perspective (self-objectification) or concern that others are viewing one's body (social physique anxiety). Although yoga has health and physical benefits, the primary goal of yoga is to unify the mind and body to create an awareness of one's body and increase the ability to respond to one's internal bodily sensations during movement (Daubenmeir, 2005). It is possible then that yoga reduces these types of self-conscious responses, perhaps due to the increase in body awareness, focusing on internal sensations rather than exercise appearance (as would be the focus of an observer).

Finally, reductions in state social physique anxiety following yoga may have also resulted from the fact that yoga may more generally reduce anxiety. Although there is limited research on the effects of yoga on social physique anxiety specifically, evidence suggests that yoga can help reduce stress and symptoms of anxiety (Cowen & Adams, 2005). These authors found that individuals who participated in a 6-week yoga intervention showed improvements on several physiological variables (flexibility, blood pressure, muscular strength and endurance) as well as psychological variables, such as health perception and perceived stress. Further, Cusumano and Robinson (1992) suggested that the refocusing of attention to bodily feelings and sensations such as stretching, tension, and breathing allows individuals

to clear the mind of stress and anxiety. Social physique anxiety is a specific form of anxiety, which can manifest in various physiological states (e.g., increase in blood pressure, muscular tension). Given that yoga has been shown to positively impact physiological variables associated with stress and anxiety, it is likely that a reduction in state social physique anxiety from yoga may have a physiological explanation to the findings of the current study as well.

By contrast, no reduction in state social physique anxiety was found following the resistance class, contrary to the hypothesis. This finding is also in contrast to previous research that has shown that both an acute step aerobics and a stability ball class led to reductions in state social physique anxiety (Lamarche et al., 2009; Lamarche & Gammage, 2009). However, it is possible that the specific type of resistance class in the present study resulted in a focus on the body indirectly, by emphasizing executing the exercises correctly and effectively by watching one's form, in order to ensure safety. In the present resistance class, the exercises had a specific technique that was emphasized, which included many cues regarding the body's positioning. Thus, participants in the resistance class may have been focusing on what they looked like while executing the exercises, to ensure they were being done properly. Yoga strives to allow each person to execute the postures in such a way that is best for them and their body, and to monitor form through monitoring how the body feels, rather than what the body looks like. The execution of the posture may be entirely different from person to person as it is difficult to force someone into the exact same pose as someone else.

Further, previous research by Lamarche and Gammage (2009) found that a stability ball class, which includes many similar resistance exercises to those used in the present study, was effective at reducing state social physique anxiety in non-exercisers. The contrary findings of the current study may be a result of the use of the resistance ball in the exercise class in previous research (Lamarche & Gammage, 2009). A resistance ball provides the participants another piece of equipment with which to perform the exercises. Since state social physique anxiety is the anxiety regarding other's evaluation, providing an object or piece of equipment that provides a barrier or coverage from the evaluation of others (and from seeing oneself in a mirror), may help to make people feel like their bodies are less on display, and therefore less likely to be evaluated by others.

Although the current study did not find a significant improvement in social physique anxiety following a resistance class as has been shown in previous research examining the effects of an acute exercise session, these findings are consistent with some previous research examining the effects of chronic resistance training. In an examination of participants in a fitness center environment, Prichard and Tiggemann (2007) found that there was no relationship between the amount of time spent on weight-based training and body image variables (i.e., self-objectification, body esteem, and disordered eating). The authors indicated that participants engaged in strength training for primarily health and fitness based reasons, which may be why there was no relationship between the variables.

5.4 *Body Satisfaction*

The BISS assesses the current or state body satisfaction of an individual. Partly consistent with the hypotheses, there was a significant increase in body satisfaction following the yoga-based class, although the resistance class was not associated with any changes in state body satisfaction. This finding is consistent with previous research examining the effects of regular yoga participation on body image. With respect to the yoga class, Dittmann and Freedman (2009) used a qualitative approach to examine the body satisfaction of individuals who regularly participated in yoga. Using open-ended questions, participants were asked how they felt about how their body had changed through yoga (if at all). The participants reported being more satisfied, content, and comfortable with their bodies, and with both the appearance and function of their bodies. Similarly, Daubenmeir (2005) found that yoga practitioners reported greater body satisfaction compared to aerobics participants and those who did not participate in either activity. In addition, Prichard and Tiggemann (2007) found that aerobic exercise was negatively correlated to body esteem (the positive or negative evaluation of one's body), while yoga and resistance training were unrelated.

One reason for this positive effect of yoga on body satisfaction may be related to the increase in body awareness associated with yoga. Thompson et al. (1999) suggested that a lack of body awareness is one of several factors related to the development of body dissatisfaction, as individuals are unable to recognize and respond to their body's sensations and cues effectively. The lack of body awareness of individuals who are dissatisfied may be a result of disconnect between the mind

and body. Yoga attempts to focus the attention inwards, connecting the mind and body, and leading the individual on a path of self-discovery. Yoga also promotes self-awareness and acceptance, leading individuals to gain an appreciation of what their bodies are capable of at a particular moment. Increased body awareness may help reduce body dissatisfaction as an individual increases the acceptance and appreciation for herself, both physically and emotionally. Given that yoga is one method by which individuals can increase their body awareness (Daubenmeir, 2005; Dittman & Freedman, 2009; Prichard & Tiggemann, 2007), this may account for the improvement in body satisfaction in the yoga based class but not the resistance based class. Through yoga, individuals can develop greater body awareness, and learn how to respond to the bodily sensations correctly and effectively, thereby increasing the level of adaptive investment.

By contrast, participation in the resistance class was not associated with any changes in body satisfaction following the class. During a resistance class, the focus is not on internal bodily sensations but rather on proper technique and performing the exercises safely and correctly. Thus, cues provided by the instructor in the resistance class primarily focused on instructions like watching body alignment, moving through a full range of motion, and proper posture, often by encouraging participants to watch themselves. These cues may lead individuals to focus on viewing themselves and their appearance, taking away from a focus on the feel of the movements. If this is the case, resistance exercise may not increase body awareness, and in turn may not result in subsequent increases in body satisfaction.

5.5 Appearance Orientation

Contrary to the hypothesis, the current study did not find any significant changes in the appearance orientation subscale of the MBSRQ following either the yoga or resistance classes. The appearance orientation subscale examines the extent to which an individual is invested in, or the importance she places on, her appearance. One of the potential reasons that no change was found on this measure is that appearance orientation represents a trait measure of body image investment than rather than a state measure. That is, it represents the general level of importance placed on appearance across most times and situations. Given that traits are relatively enduring characteristics it may not be surprising that a single exercise class was unable to significantly change it.

Although the influence of chronic exercise programs on appearance orientation has not been investigated, research has shown that chronic cognitive behavioural programs can reduce investment in appearance (Cash & Lavallee, 1997). A study conducted by Fisher and Thompson (1994) found that individuals who participated in a 6 week intervention of cognitive behavioural therapy (CBT) or exercise therapy (ET) of aerobic dance and weight lifting had similar reductions in body image disturbance after completing the intervention. Given that exercise interventions can be as effective as CBT interventions in improving an individual's body image, it may be useful to investigate further exercise interventions and their impact on appearance orientation in the future.

Further, Prichard and Tiggemann (2007) found that both weight training and yoga were positively associated with exercising for health/fitness reasons and

negatively associated with exercising for appearance reasons. It is possible that those who exercise less for appearance motives may be less invested in their appearance. Although a single class may not lead to changes in investment, a chronic exercise program may influence an individual's level of investment in her appearance.

It is also possible that investment did not change following either exercise class due to how it was measured. Two types of investment have been identified: motivational salience (adaptive) and self-evaluative salience (maladaptive; Cash, 2003). Motivational salience refers to attending to appearance by engaging in grooming and self-management behaviours. Self-evaluative salience refers to individuals defining or measuring themselves based on their physical appearance, which they believe is influential in their social and emotional experiences. In the current study, the measure of appearance investment more closely coincided with motivational salience. Given that yoga strives to bring the focus inwards and connect the mind and body, allowing individuals to gain appreciation and acceptance of their bodies, it is possible that it may impact the two types of investment differently. For instance, while yoga might increase motivational salience slightly, it might help to reduce self-evaluative salience more significantly, as physical appearance becomes less important, and internal body sensations become more important. In the present study, it was not possible to differentiate between these two types of investment. Distinguishing between these two types of investment when examining the effects of different types of exercise on investment in appearance in future research may be needed.

5.6 Limitations

Several potential limitations to the current research exist. Because the participants were all healthy female university students who were non/infrequent exercisers, the results are generalizable only to this group. Therefore, findings from the current study cannot be applied to other age groups, men, or more active individuals.

Secondly, the participants were non/infrequent exercisers, meaning they exercised, on average, two or fewer times per week. However, the participants were asked to indicate the three most common activities in which they had participated in previously. More participants indicated that they had previously engaged in weight training than in yoga. Thus, participants may have been more familiar with weight training form and technique than with yoga form and technique. If this was the case, participants may have had to pay more attention to the movements in yoga. By contrast, familiarity with weight training movements may have allowed participants to watch their bodies and their appearance, rather than focusing on their form. Therefore, it is possible that differences in body image were due to familiarity with the type of exercise, rather than the exercise itself. Additionally, the study used a repeated measures design, with classes occurring over a two-week period to ensure any changes in state body image were due to the specific class type, rather than improvements due to chronic training. However, it is possible that factors outside of the study (e.g., exams, eating behaviours) may have affected state body image or social physique anxiety.

In addition, the primary researcher was the exercise leader for the study. This could have resulted in demand characteristics, as well as a bias on the part of the researcher. Specifically, given that the researcher had a priori hypotheses, it is possible that she could have consciously or unconsciously created differences in the two class types. Several precautions were taken to minimize these potential threats. Data wasa collected by research assistants to minimize demand characteristics. Second, research assistants were also responsible for all data entry to ensure that the primary researcher did not see any results until completion of all data collection. Further, the development of the classes were done in collaboration with the supervisor to ensure that the classes were similar and cues were consistent. Lastly, the cues were developed for each class and remained consistent (as assessed by a research assistant during the classes) between the classes ensuring that the exercise leader was not using the cues to potentially influence the participants body image attitudes.

Further, the study did take place in a laboratory setting. Although it was an exercise intervention laboratory designed to resemble a fitness studio/gym, there is the possibility that the participants may have been influenced by the laboratory setting itself. Although the laboratory is designed to mimic a fitness environment, there are some characteristics of the space that may limit its ecological validity. The space is relatively small in comparison to a typical commercial fitness studio, thereby limiting the total number of participants who can participate in a class at one time. The weight training studio and fitness floor are open concept and exist in the same room. The participants also did not have to engage in typical pre- and post- exercise activities,

such as changing in a locker room, signing-in for classes, or showering after class. Further, the completion of questionnaires during the exercise class was also not typical of a 'real' exercise session. Thus, although attempts were made to promote ecological validity, there were some differences to real-life fitness settings.

Another important issue is the potential for social desirability bias in participant responses. Given the sensitive nature of the questions, participants may have provided answers that they believed were socially acceptable. For instance, participants may not have wanted to be seen as caring too much about their appearance or the participants may have been embarrassed to report honest answers for fear of appearing too different from others. Thus, whether purposely or not, participants' responses to questions may have been inaccurate.

There also may have been some differences in class to class content. Although the classes were standardized as much as possible there may have been slight differences to ensure the participants safety and to account for participants' varying abilities. For example, the number of repetitions of an exercise, the time spent on an exercise, or the detail of instructions provided may have differed slightly from class to class, in response to watching specific participants' performance. These differences were essential to ensure participants were not injured during the class. Also, the instructions for the resistance class tended to be longer and more detailed, as the focus in yoga-based class was getting participants to feel movements. Although it is unlikely that these differences accounted for differences in changes to body image between the two class types, they cannot be completely ruled out.

5.7 Implications and Future Directions

The findings of the current study suggest that acute exercise can be used to potentially improve an individual's state body image. Specifically, yoga or mind-body based exercise appears to be effective in improving state body image. Types of exercise that focus on body awareness and the ability to respond to bodily sensations and cues may have the greatest impact on state body image. In addition to yoga, these types of activities may include things like tai chi or pilates. It may also be possible to increase the sense of body awareness in more traditional exercise classes, by emphasizing the feel of specific exercises, rather than how people look while performing them. For example, rather than asking participants in a resistance class to watch themselves in a mirror to make sure they go through a full range of motion on a particular exercise, they could be encouraged to feel a muscle lengthen as much as possible, and contract as short as possible. Although the performance of the movement should be the same in both cases, the first instructions encourage participants to watch themselves as an observer, while the second instructions encourage them to experience body sensations.

In particular with non-exercisers, the fact that a single exercise session shows body image improvements has important implications. It may be more feasible to convince non-exercisers to try a single exercise session than convince them to participate in a 6 or 8 week exercise program. If they can be encouraged to try one session, and they experience a positive outcome with respect to body image (i.e., reduced state social physique anxiety, increased body satisfaction) they may be more likely to continue to exercise. However, this contention has yet to be tested. Further,

these findings may have implications for individuals who are looking to improve their body image or who have high body image concerns, as participation in a yoga-based activity may result in a more positive improvement in body image than participation in resistance based activities. These individuals in particular should be encouraged to participate in yoga, or other activities promoting body awareness. This is beneficial as yoga may be used as an option for treatment to improve body image, or in conjunction with other forms of treatment, in particular with groups known to experience poor body image (e.g., overweight individuals, young women, individuals with eating disorders).

Future research should examine the effects of acute exercise and yoga on body image in other populations (e.g., males, children, older women, etc) to determine if other groups also benefit from a single exercise session. Future research should also examine individuals who are experienced exercisers; it is possible that a single session may not be as effective in improving body image in this group, as they have already received the body image benefits of regular exercise. It is also possible that longer-term yoga programs could have an even greater impact on body image than a single session. Further research should examine the effect of a single session of yoga compared to a chronic intervention using yoga-based activities. It may also be useful to determine the time-course of body image changes as a result of yoga. That is, at what point in a chronic yoga program are body image improvements maximized. Finally, investigation of the mechanisms of state body image changes as a result of acute exercise could be investigated. For example, following the exercise sessions,

participants could be asked to indicate what they focused on (e.g., the physical appearance of their body versus the feeling of their movements) in each type of class.

Finally, the examination of other types or styles of activities (e.g., other group fitness classes, recreational or competitive sports, general gym usage, and individual fitness activities) and looking at activities outside of group fitness in comparison to yoga should also be investigated. Further investigation of resistance exercise and body image variables needs to be examined, given the mixed findings of previous research. Research into the different aspects of yoga (e.g., breathing, postures, relaxation, and meditation) and types of yoga (e.g., Hatha, Bikram, hot yoga) could be examined to find what aspect of yoga is most influential in the improvement of body image variables.

5.8 Conclusions

The current study examined the effect of two types of acute exercise (resistance and mind-body yoga) on state body image attitudes, to see which, if either, was most effective at reducing body image concerns (body satisfaction, state social physique anxiety, and appearance investment). The findings from the current study partially supported the hypotheses, with participation in the yoga class associated with decreases in state social physique anxiety and increases in body satisfaction, but no change in appearance orientation. By contrast, participation in the resistance class was associated with no changes in any of the study variables. These finding are important as participation in yoga based activities may have positive implications for participants regarding body image attitudes, which may be different from participation in other types of activities such as cardiovascular or resistance-based

activities. Further a single exercise session may be influential in improving body image variables and a chronic exercise program may not be necessary to show improvements in body image. These findings have practical implications as they could be used to help individuals experience a positive improvement in body image variables with participation in exercise.

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Figure 1. Social Physique Anxiety Time * Class Type Interaction

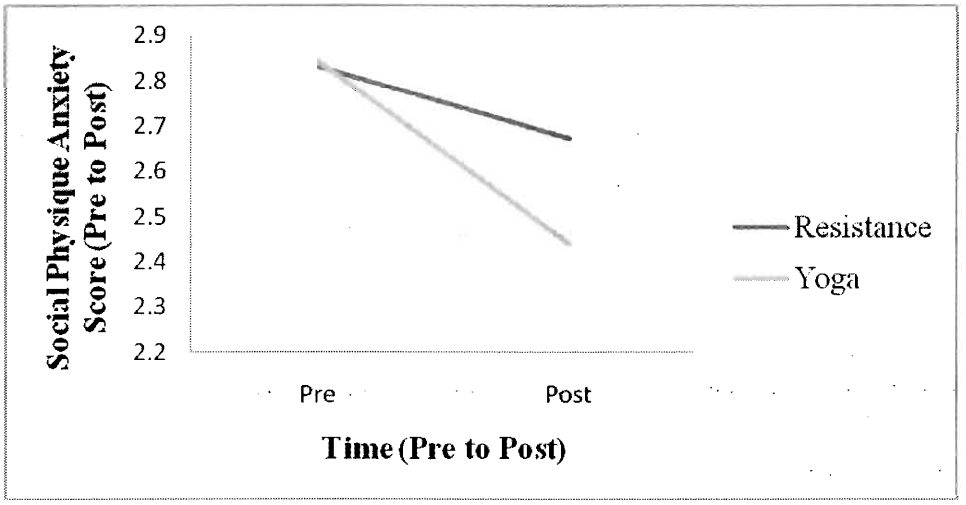


Figure 2. BISS Time * Class Type Interaction

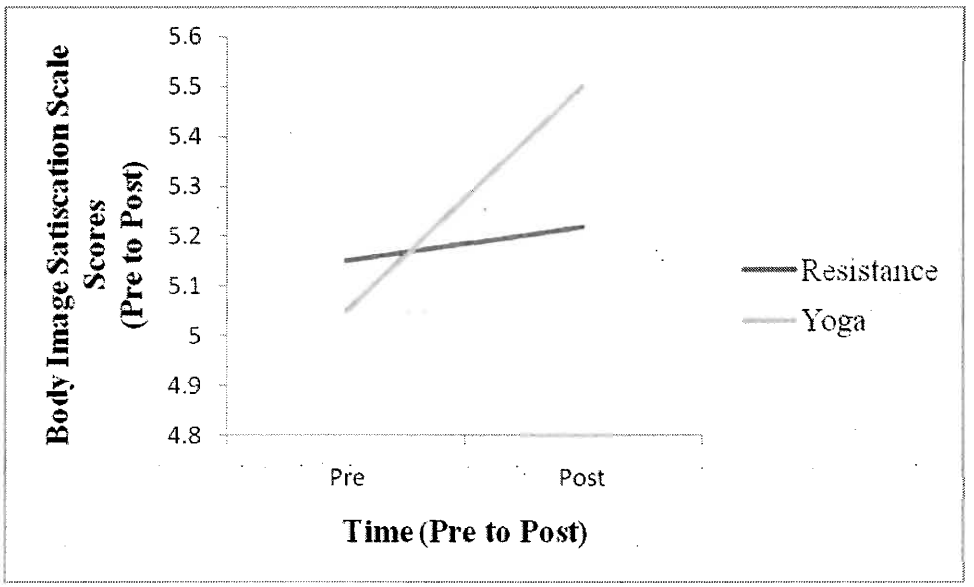


Table 1

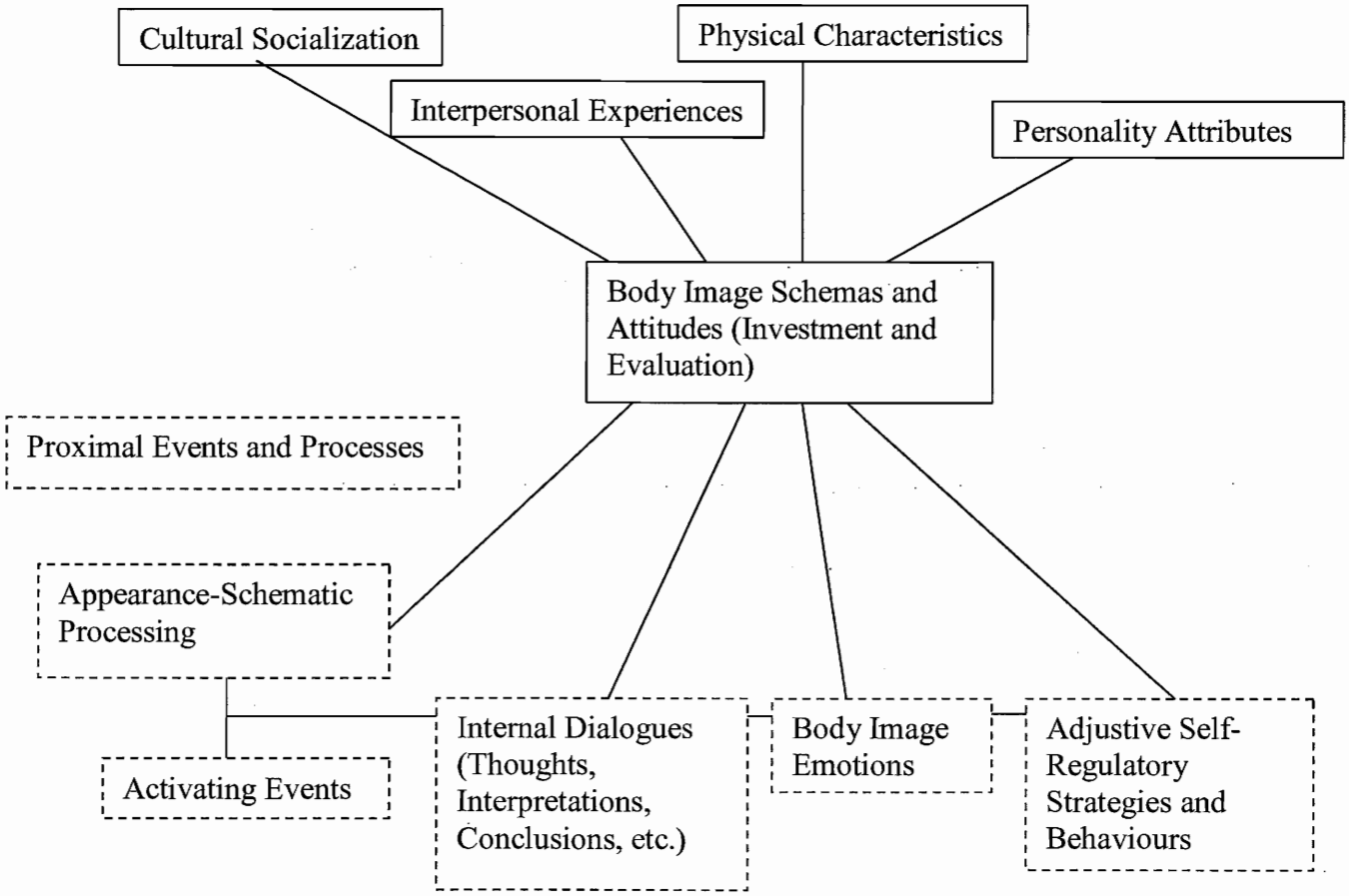
Means and Standard Deviations for Body Image Variables by Class Type

Variable	Pre-Resistance	Post-Resistance	Pre-Yoga	Post-Yoga
BISS	5.10 (1.44)	5.15 (1.55)	5.05 (1.45)	5.50 (1.44)
SPA	2.84 (0.94)	2.71 (0.99)	2.85 (0.94)	2.45 (0.91)
MBSRQ-AO	3.60 (0.60)	3.65 (0.63)	3.63 (0.63)	3.65 (0.65)

Note. Means and standard deviation by class type for each of the variables.

Appendix A

Cognitive Behavioural Model of Body Image. (Cash, 2004)


Cultural Socialization
Physical Characteristics
Interpersonal Experiences
Personality Attributes
Body Image Schemas and Attitudes (Investment and Evaluation)
Proximal Events and Processes
Appearance-Schematic Processing
Activating Events
Internal Dialogues (Thoughts, Interpretations, Conclusions, etc.)
Body Image Emotions
Adjustive Self-Regulatory Strategies and Behaviours

Appendix B

Initial Demographic and Trait Measures

Demographic Questionnaire

Age: _____ Gender: _____

Major: _____

Height: _____ Weight: _____

On average, how many times per week do you exercise? _____

On average, how long is your typical exercise session? _____

Please list (if any) the three most common physical activities you engage in?

_____

_____

_____

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
☐	☐	1. **Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2. **Do you feel pain in your chest when you do physical activity?**
☐	☐	3. **In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4. **Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5. **Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6. **Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7. **Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

→ **DELAY BECOMING MUCH MORE ACTIVE:**

- If you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- If you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

Supported by: Health Canada / Santé Canada

continued on other side...

SPAS-T

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you, according to the following scale:

1 = Not at all characteristic of me
2 = Slightly characteristic of me
3 = Moderately characteristic of me
4 = Very characteristic of me
5 = Extremely characteristic of me

1. I wish I wasn't so uptight about my physique/ figure	**1**	**2**	**3**	**4**	**5**
2. There are times when I am bothered by thoughts that other people are evaluating my weight or muscular development t negatively	**1**	**2**	**3**	**4**	**5**
3. Unattractive features of my physique/ figure make me nervous in certain social settings	**1**	**2**	**3**	**4**	**5**
4. In the presence of others, I feel apprehensive about my physique/ figure	**1**	**2**	**3**	**4**	**5**
5. I am comfortable with how fit my body appears to others	**1**	**2**	**3**	**4**	**5**
6. It would make me uncomfortable to know others were evaluating my physique/ figure	**1**	**2**	**3**	**4**	**5**
7. When it comes to displaying my physique/ figure to others, I am a shy person	**1**	**2**	**3**	**4**	**5**
8. I usually feel relaxed when it is obvious that others are looking at my physique/ figure	**1**	**2**	**3**	**4**	**5**
9. When in a bathing suit, I often feel nervous about the shape of my body	**1**	**2**	**3**	**4**	**5**

Appendix C

Pre-Exercise Questionnaires

SPAS - S

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you <u>in this situation (exercise class).</u> Use the following scale. Circle the appropriate value following each statement.

1 = Not at all characteristic of me
2 = Slightly characteristic of me
3 = Moderately characteristic of me
4 = Very characteristic of me
5 = Extremely characteristic of me

1. I feel uptight about my physique/figure	**1**	**2**	**3**	**4**	**5**
2. I am bothered by thoughts that the other people in the room are evaluating my weight or muscular development negatively	**1**	**2**	**3**	**4**	**5**
3. Unattractive features of my physique/figure make me nervous in this setting.	**1**	**2**	**3**	**4**	**5**
4. In this environment, I feel apprehensive about my physique/figure.	**1**	**2**	**3**	**4**	**5**
5. I am comfortable with how fit my body appears to the others.	**1**	**2**	**3**	**4**	**5**
6. It would make me uncomfortable to know that other people in the room were evaluating my physique/figure.	**1**	**2**	**3**	**4**	**5**
7. When it comes to displaying my physique/figure in this setting, I feel shy.	**1**	**2**	**3**	**4**	**5**
8. Sitting here in my workout clothes, I feel nervous about the shape of my body.	**1**	**2**	**3**	**4**	**5**
9. I feel relaxed when it is obvious that others are looking at my physique/figure.	**1**	**2**	**3**	**4**	**5**

BISS

For each of the items below, check the box beside the one statement that best describes how you feel RIGHT NOW AT THIS VERY MOMENT. Read the items carefully to be sure the statement you choose accurately and honestly describes how you feel right now.

1. Right now I feel…
   - ☐ **Extremely dissatisfied** with my physical appearance
   - ☐ **Mostly dissatisfied** with my physical appearance
   - ☐ **Moderately dissatisfied** with my physical appearance
   - ☐ **Slightly dissatisfied** with my physical appearance
   - ☐ **Neither dissatisfied nor satisfied** with my physical appearance
   - ☐ **Slightly satisfied** with my physical appearance
   - ☐ **Moderately satisfied** with my physical appearance
   - ☐ **Mostly satisfied** with my physical appearance
   - ☐ **Extremely satisfied** with my physical appearance

2. Right now I feel…
   - ☐ **Extremely satisfied** with my body size and shape
   - ☐ **Mostly satisfied** with my body size and shape
   - ☐ **Moderately satisfied** with my body size and shape
   - ☐ **Slightly satisfied** with my body size and shape
   - ☐ **Neither dissatisfied nor satisfied** with my body size and shape
   - ☐ **Slightly dissatisfied** with my body size and shape
   - ☐ **Moderately dissatisfied** with my body size and shape
   - ☐ **Mostly dissatisfied** with my body size and shape
   - ☐ **Extremely dissatisfied** with my body size and shape

3. Right now I feel…
   - ☐ **Extremely satisfied** with my weight
   - ☐ **Mostly satisfied** with my weight
   - ☐ **Moderately satisfied** with my weight
   - ☐ **Slightly satisfied** with my weight
   - ☐ **Neither dissatisfied nor satisfied** with my weight
   - ☐ **Slightly dissatisfied** with my weight
   - ☐ **Moderately dissatisfied** with my weight
   - ☐ **Mostly dissatisfied** with my weight
   - ☐ **Extremely dissatisfied** with my weight

4. Right now I feel…
   - ☐ **Extremely** physically **attractive**
   - ☐ **Very** physically **attractive**
   - ☐ **Moderately** physically **attractive**
   - ☐ **Slightly** physically **attractive**
   - ☐ **Neither attractive nor unattractive**
   - ☐ **Slightly** physically **unattractive**
   - ☐ **Moderately** physically **unattractive**
   - ☐ **Very** physically **unattractive**
   - ☐ **Extremely** physically **unattractive**

5. Right now I feel…
   - ☐ **A great deal worse** about my looks than I usually feel
   - ☐ **Much worse** about my looks than I usually feel
   - ☐ **Somewhat worse** about my looks than I usually feel
   - ☐ **Just slightly worse** about my looks than I usually feel
   - ☐ **About the same** about my looks than I usually feel
   - ☐ **Just slightly better** about my looks than I usually feel
   - ☐ **Somewhat better** about my looks than I usually feel
   - ☐ **Much better** about my looks than I usually feel
   - ☐ **A great deal better** about my looks than I usually feel

6. Right now I feel I look…
   - ☐ **A great deal better** than the average person looks
   - ☐ **Much better** than the average person looks
   - ☐ **Somewhat better** than the average person looks
   - ☐ **Just slightly better** than the average person looks
   - ☐ **About the same** as the average person looks
   - ☐ **Just slightly worse** than the average person looks
   - ☐ **Somewhat worse** than the average person looks
   - ☐ **Much worse** than the average person looks
   - ☐ **A great deal worse** about than the average person looks

MBSRQ

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally.

In order to complete the questionnaire, read each statement carefully and decide how much it pertains to you personally. Using a scale like the one below, indicate your answer by entering it to the left of the number of the statement.

EXAMPLE:

_____ I am usually in a good mood.

In the blank space,
enter a **1** if you **definitely disagree** with the statement;
enter a **2** if you **mostly disagree**;
enter a **3** if you **neither agree nor disagree**;
enter a **4** if you **mostly agree**;
or enter a **5** if you **definitely agree** with the statement.

There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.

1	2	3	4	5
Definitely Disagree	**Mostly Disagree**	**Neither Agree Nor Disagree**	**Mostly Agree**	**Definitely Agree**

___

_____ 1. Before going out in public, I always notice how I look.
_____ 2. I am careful to buy clothes that will make me look my best.
_____ 3. I check my appearance in a mirror whenever I can.
_____ 4. Before going out, I usually spend a lot of time getting ready.
_____ 5. It is important that I always look good.
_____ 6. I use very few grooming products.
_____ 7. I am self-conscious if my grooming isn't right.
_____ 8. I usually wear whatever is handy without caring how it looks.
_____ 9. I don't care what people think about my appearance.
_____ 10. I take special care with my hair grooming.
_____ 11. I never think about my appearance.
_____ 12. I am always trying to improve my physical appearance.

Appendix D

Post-Exercise Measures

SPAS - S

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you <u>in the exercise class you just completed.</u> Use the following scale. Circle the appropriate value following each statement.

1 = Not at all characteristic of me
2 = Slightly characteristic of me
3 = Moderately characteristic of me
4 = Very characteristic of me
5 = Extremely characteristic of me

1. I felt uptight about my physique/figure	**1**	**2**	**3**	**4**	**5**
2. I was bothered by thoughts that the other people in the room were evaluating my weight or muscular development negatively	**1**	**2**	**3**	**4**	**5**
3. Unattractive features of my physique/figure made me nervous in this setting.	**1**	**2**	**3**	**4**	**5**
4. In this environment, I felt apprehensive about my physique/figure.	**1**	**2**	**3**	**4**	**5**
5. I was comfortable with how fit my body appeared to the others.	**1**	**2**	**3**	**4**	**5**
6. It made me uncomfortable to know that other people in the room were evaluating my physique/figure.	**1**	**2**	**3**	**4**	**5**
7. When it came to displaying my physique/figure in this setting, I felt shy.	**1**	**2**	**3**	**4**	**5**
8. Sitting here in my workout clothes, I felt nervous about the shape of my body.	**1**	**2**	**3**	**4**	**5**
9. I felt relaxed when it was obvious that others were looking at my physique/figure.	**1**	**2**	**3**	**4**	**5**

BISS

For each of the items below, check the box beside the one statement that best describes how you feel RIGHT NOW AT THIS VERY MOMENT. Read the items carefully to be sure the statement you choose accurately and honestly describes how you feel right now.

1. Right now I feel...

   ☐ **Extremely dissatisfied** with my physical appearance
   ☐ **Mostly dissatisfied** with my physical appearance
   ☐ **Moderately dissatisfied** with my physical appearance
   ☐ **Slightly dissatisfied** with my physical appearance
   ☐ **Neither dissatisfied nor satisfied** with my physical appearance
   ☐ **Slightly satisfied** with my physical appearance
   ☐ **Moderately satisfied** with my physical appearance
   ☐ **Mostly satisfied** with my physical appearance
   ☐ **Extremely satisfied** with my physical appearance

2. Right now I feel...

   ☐ **Extremely satisfied** with my body size and shape
   ☐ **Mostly satisfied** with my body size and shape
   ☐ **Moderately satisfied** with my body size and shape
   ☐ **Slightly satisfied** with my body size and shape
   ☐ **Neither dissatisfied nor satisfied** with my body size and shape
   ☐ **Slightly dissatisfied** with my body size and shape
   ☐ **Moderately dissatisfied** with my body size and shape
   ☐ **Mostly dissatisfied** with my body size and shape
   ☐ **Extremely dissatisfied** with my body size and shape

3. Right now I feel...

   ☐ **Extremely satisfied** with my weight
   ☐ **Mostly satisfied** with my weight
   ☐ **Moderately satisfied** with my weight
   ☐ **Slightly satisfied** with my weight
   ☐ **Neither dissatisfied nor satisfied** with my weight
   ☐ **Slightly dissatisfied** with my weight
   ☐ **Moderately dissatisfied** with my weight
   ☐ **Mostly dissatisfied** with my weight
   ☐ **Extremely dissatisfied** with my weight

4. Right now I feel...

- ☐ **Extremely** physically **attractive**
- ☐ **Very** physically **attractive**
- ☐ **Moderately** physically **attractive**
- ☐ **Slightly** physically **attractive**
- ☐ **Neither attractive nor unattractive**
- ☐ **Slightly** physically **unattractive**
- ☐ **Moderately** physically **unattractive**
- ☐ **Very** physically **unattractive**
- ☐ **Extremely** physically **unattractive**

5. Right now I feel...

- ☐ **A great deal worse** about my looks than I usually feel
- ☐ **Much worse** about my looks than I usually feel
- ☐ **Somewhat worse** about my looks than I usually feel
- ☐ **Just slightly worse** about my looks than I usually feel
- ☐ **About the same** about my looks than I usually feel
- ☐ **Just slightly better** about my looks than I usually feel
- ☐ **Somewhat better** about my looks than I usually feel
- ☐ **Much better** about my looks than I usually feel
- ☐ **A great deal better** about my looks than I usually feel

6. Right now I feel I look...

- ☐ **A great deal better** than the average person looks
- ☐ **Much better** than the average person looks
- ☐ **Somewhat better** than the average person looks
- ☐ **Just slightly better** than the average person looks
- ☐ **About the same** as the average person looks
- ☐ **Just slightly worse** than the average person looks
- ☐ **Somewhat worse** than the average person looks
- ☐ **Much worse** than the average person looks
- ☐ **A great deal worse** about than the average person looks

MBSRQ

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally.

In order to complete the questionnaire, read each statement carefully and decide how much it pertains to you personally. Using a scale like the one below, indicate your answer by entering it to the left of the number of the statement.

EXAMPLE:

_____ I am usually in a good mood.

In the blank space,
enter a **1** if you **definitely disagree** with the statement;
enter a **2** if you **mostly disagree**;
enter a **3** if you **neither agree nor disagree**;
enter a **4** if you **mostly agree**;
or enter a **5** if you **definitely agree** with the statement.

There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.

1	2	3	4	5
Definitely Disagree	**Mostly Disagree**	**Neither Agree Nor Disagree**	**Mostly Agree**	**Definitely Agree**

_____ 1. Before going out in public, I always notice how I look.
_____ 2. I am careful to buy clothes that will make me look my best.
_____ 3. I check my appearance in a mirror whenever I can.
_____ 4. Before going out, I usually spend a lot of time getting ready.
_____ 5. It is important that I always look good.
_____ 6. I use very few grooming products.
_____ 7. I am self-conscious if my grooming isn't right.
_____ 8. I usually wear whatever is handy without caring how it looks.
_____ 9. I don't care what people think about my appearance.
_____ 10. I take special care with my hair grooming.
_____ 11. I never think about my appearance.
_____ 12. I am always trying to improve my physical appearance.

RPE

Using the scale below, which number best describes your level of exertion during the exercise class today.

0	nothing at all
.5	extremely weak (just noticeable)
1	very weak
2	weak (light)
3	moderate
4	somewhat strong
5	strong (heavy)
6	
7	very strong
8	
9	
10	extremely strong (almost maximal)

My level of exertion during this exercise class was: _____.

Appendix E- Ethics Clearance

DATE: December 18, 2008

FROM: Michelle McGinn, Chair Research Ethics Board (REB)

TO: Dr. Kimberley Gammage, Physical Education & Kinesiology, Breanne Drouin, Kim Juniper

FILE: 08-151 GAMMAGE/DROUIN Masters Thesis/Project

TITLE: Acute Exercise and Exercise-Related Cognitions

The Brock University Research Ethics Board has reviewed the above research proposal.

DECISION: ACCEPTED AS CLARIFIED
This project has received ethics clearance for the period of **December 18, 2008 to April 30, 2010** subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The clearance period may be extended upon request. ***The study may now proceed.***

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and cleared by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written clearance from the REB. The Board must provide clearance for any modifications before they can be implemented. If you wish to modify your research project, please refer to http://www.brocku.ca/researchservices/forms to complete the appropriate form Revision or Modification to an Ongoing Application.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form *Continuing Review/Final Report* is required.

Please quote your REB file number on all future correspondence.

Appendix F- Recruitment Poster

Acute Exercise & Cognitions Research Study

PURPOSE

- **To examine the effect of acute exercise on exercise-related cognitions**

PARTICIPANTS

- **Brock University students who exercise less than twice a week and are physically able to participate in exercise**

WHAT IS INVOLVED?

- **Participants will be asked to complete three one-hour exercise sessions and fill out several questionnaires**
- **Each session will include 30 minutes of exercise and 30 minutes of questionnaires.**

BENEFITS:

- **Study will further the scientific knowledge regarding exercise and exercise-related cognitions**
- **Gain the benefits of physical activity and exercise participation**

If interested, please contact:

Dr. Kimberley Gammage **Breanne Drouin**
kgammage@brocku.ca, x. 3772
breanne.drouin@brocku.ca

This study has been reviewed and received ethics clearance through the **REB (File #** 08-151). For answers to pertinent questions about research participant's rights, please contact the Research Ethics Office at 905-688-5550 ext. 3035, reb@brocku.ca

Appendix G- Informed Consent Form

Informed Consent
Date:
Project Title: **Acute Exercise and Exercise-Related Cognitions**

Principal Investigator:
Dr. Kimberley Gammage, Associate Professor
Department of Physical Education and Kinesiology
Brock University
(905) 688-5550 Ext. 3772,
kgammage@brocku.ca

Co-Investigators
Breanne Drouin,
MA Applied Health Science Candidate
breanne.drouin@brocku.ca
Kim Juniper, Undergraduate Thesis, PEKN
kj05ym@brocku.ca

INVITATION

You are invited to participate in a study that involves research. The purpose of this research project is to examine the effects of acute exercise on exercise-related cognitions.

WHAT'S INVOLVED

As a participant, you will be asked to participate in three separate one-hour group exercise sessions. Each of the three sessions will consist of a 30 minute exercise class and 30 minutes of questionnaires, for a total of 3 hours of participation. Each of the classes will include only participants of the same gender. You will be asked to complete a demographic form and questionnaires prior to the exercise sessions, in addition to another set of questionnaires at the conclusion of the exercise session. The questionnaires will include questions regarding exercise and exercise participation, exercise related cognitions, and questions about confidence and anxiety about the body. Debriefing and a request for results will be completed after all the exercise sessions are completed. Participation will take approximately 3 hours of your time.

POTENTIAL BENEFITS AND RISKS

Possible benefits of participation include furthering the knowledge of exercise cognitions within the scientific community. Additionally, the participants will gain the positive benefits of participating in exercise. However, to gain the optimal benefits from exercise, engaging in physical activity on a regular basis is beneficial. Some risks of the associated with participating in physical activity, however, all classes are designed for beginners and taught by a certified instructor. Further, due to the sensitive nature of some of the questions in the questionnaires, you are not required to answer any question which you are not comfortable completing. If any issue arises from the nature of the questions you can contact Dr. Kimberley Gammage at extension 3772 or Student Health Services at extension 3243 where relevant resources and counselling services are available for all students.

CONFIDENTIALITY

All information you provide is considered confidential, because our interest is in the average responses of the entire group of participants, you will not be identified

individually in any way in written reports of this research. The researchers ask that you respect the privacy of others who may be involved in this study. Data collected during this study will be stored on campus in a locked cabinet in Dr. Kimberley Gammage's office. Data will be kept for one year after which time all data will be shredded. Access to this data will be restricted to the principal investigator or co-investigators.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study and may do so without any penalty or loss of benefits to which you are entitled. However, once all the data has been collected and entered, withdrawal will not be possible as there will be no way of identifying what questionnaires belong to a participant.

PUBLICATION OF RESULTS

Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available. For information regarding the results of this study, please fill out a request of results form.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact the Principal Investigator using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University **(REB #** 08-151**)**. If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

CONSENT FORM

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: _____

Signature: _____ **Date:** _____

Appendix H: Class Checklists

Warm Up	**Check**	**Cues**	**Check**
Start time _____		**Will count down from 8 for all exercises in warm-up**	
16 march		Start to march on the spot for 16	
16 wide march 8 Regular march		Into wide march for 16	
16 step touch		Taking it to a step touch	
8 double step touch		Double step touch- two step touches left and right	
16 jogging on the spot		Jog on spot for 16	
32 (4x) Jogging front (4 cts) and back (4 cts)		Okay- take the jog to the front for 4-3-2-1 and back 4-3-2-1	
Jog on spot for 8		And back to the jog on the spot for 4-3-2-1	
8 Skipping on the spot		Changing the jog to a skip- side to side	
32 (4x) Skipping front (4 cts) and back (4 cts)		Taking the skip forward for 4-3-2-1 and back 4-3-2-1	
8 skip on the spot		Back to skipping on the spot	
End time _____			

Resistance Training	Check	Cues	Check
Start Time _____		**All done as 2 x 12, at tempo, will count aloud for each exercise from 8** -If at any time, you need to reduce the weights, please do, feel free to put the weights on the floor and you can continue to do the exercise without weight	
Bicep Curls		Holding weights in hands, elbows tucked in, feet shoulder width apart, curling up and down, nice and slow, control the weight, breathe	
Tricep Extensions		Holding one weight in both hands, bring hands behind head, elbows together, lowering weight behind head and back up to full extension, remember to breathe	
Alternating Lunges (2 x one leg at a time)		Weights in hands, place hands on hips or let hang beside you, step forward with right leg, toes pointing forward, back up tall, bending up and down, making sure your knees are in line with your ankle, switching legs	
Shoulder Press		Holding those weights, lifting them up to your shoulders, palms facing the mirror, holding them out, pushing them to the ceiling and bringing them down, nice and slow	
Calf Raises (no weight, against wall, 1 set double, 1 set single, 1 set double, 1 set single)		Standing on both feet, shoulder width apart, holding weights in hands at your side, pushing up onto your toes, legs straight, standing tall and breathe, and back down, and let your heels just touch the floor	
Bent-over single arm rows (one arm at a time in split stance) ****WATER BREAK****		Alright, so bending over, only one weight in one hand, other hand on thighs, taking that weight and letting it hang to the floor, bringing that elbow right back up to the ceiling and back down, and switching hands	
Bent over reverse flies (on one knee)		Weights in both hands now, still bent over, lifting both arms with a small bend at the elbow, up and out	

		from the sides, making sure to hold in your stomach- protect your lower back	
Squats		Feet shoulder width apart, can hold weights in hands at side, sitting down like you are in a chair, sticking your bum back, knees not going over your toes, and back up, and turning those feet out, place the weights on your thighs/hips, and same thing, bending those knees and pretending to sit down, and up, backs tall and straight	
Chest Press on ground		Laying down on ground, putting those weights in your hand, elbows out, weights up over your chest, and bringing those elbows towards the floor, don't let them touch and bringing them back up	
Push ups modified 2 x 8		Back flat, hips down, from your knees, pushing down and up for 8, and one more set.	
Basic Crunches		Okay so we are going to start with some core work here, so knees bent, feet on the floor, hands at side of head, but not lifting your head, using your abs to pull up, and basic crunch here	
Basic Cross-overs (one side then the other)		Crossing one leg over the other, taking the opposite elbow to your knee, and crossing over, and switching sides here, repeat on left	
Superman- laying		Switching onto our stomachs, heads face down on the mat, taking your left arm and right leg, and reaching them out and off the floor, switching sides to the right arm and left leg, and continue to alternate	
End Time _____			

Stretching	Check	Cues	Check
Start time_____		**all stretches held for 10 seconds, both sides if applicable, and muscle being stretched will be explained**	
Lay- stretch on back		Lay on back and lengthen body as much as possible with hands over top head	
Hamstrings on back		Lift one leg up, extend as much as possible, hold behind hamstring, rotate ankle one way, then other, flex foot, try to bring foot in a little closer for deeper stretch if you can	
Figure 4		Cross one ankle over opposite knees – knee towards chest	
Butterfly Stretch			
Hamstring stretch in front- reach toes			
Standing roll up to ham stretch		Tuck feet underneath, roll up slowly and let body hang relaxed	
Step side- arm across front- switch arms		Step out to side, and bring one arm across chest, switching arms	
Tricep stretch- both arms		Bring one arm behind head, and grab elbow for a tricep stretch	
Step front- hip flexor stretch- both legs		Stepping to the front, tucking your hips underneath you, feeling a stretch in your hip flexor down the front of your leg/hip here, switch	
Round out to front		Arms out in front, clasp hands, and round out back, looking to the floor	
Chest stretch		Arms behind you, clasp them if you can, and lift up and look up at the ceiling for a chest stretch	
Standing tall- plie with deep breath in and arms over head x3		Standing up tall, taking a deep breath in and bringing your arms over your head, and exhale and let them come down, repeat 3 times	
End time _____			

Move	Comments
Tabletop	Breathing in and out through nose x2
Cat/cow x 4	Round back (breathe in), lift chin (breathe out)
Alternate arm/leg lifts x 4 per side	Hold each 2-3 breaths; breathe in on lift, exhale on down
Downward dog hold 2 breaths	Heels press down, fingers spread out, hips high, breathe out as push up
Step forward right and left	
Into forward fold	Fingers on floor, top of head to floor looking at knees
Stand, arms above head	Breathe in
Mountain pose	Hands by side, palms forward; Breathe out
Arms overhead, back bend	Breathe in as arms come up
Swan dive forward (exhale)	Hands to floor
Straighten back and lift upper body	Breathe
Forward fold	Turn from side to side while hanging down
Step back right leg into lunge	Hands on either side of feet, knee down on floor, unfold back foot
x 2 breaths	Drop knee, uncurl toes, lift upper body and breathe
Hands back on either side of foot	
Step back left	
Modified plank	Knees
Tricep push up all the way down to floor	Knees- describe as slowly lower body, elbows in close, for 4 counts down
Half cobra	Hands under shoulders, breathe in
Release to floor	Breathe out
Child's pose	2 breaths – hands in front
Table top	Breathe in and out
Downward dog	Breathe out as you raise hips to ceiling – peddle feet up and down
Step forward with right foot into lunge	Drop left knee to floor, uncurl back foot
Lift hands above head x 2 breaths	
Hands back on either side of foot	
Modified plank	Knees
Tricep push up all the way down to floor	Knees
Cobra or half cobra	Cobra: hands slightly in front of shoulders, press up through upper body breathing in
Release down to floor	Exhale
Tabletop	Breathe in
Downward dog	Exhale

Step forward left leg and right leg	
Into forward fold	
Straighten back and lift upper body	Hands still on floor, Breathe in
Fold	Exhale
Chair x 2 breaths (like squat)	Bend knees and lift upper body, arms reaching forward, shoulders down away from ears
Breathe in standing all the way up	Arms above head
Exhale mountain pose	
Arms up back bend	Breathe in
Swan dive forward	Hands on floor, Breathe out
Downward dog	Step back left and right legs, one breath in and out here
Step forward with left foot lunge on knee	Unfold back foot
Hands up above head	Breathe in
Hands on floor on either side of foot	
Warrior 1	Turn back foot out 45 degrees, front knee bent, back foot on floor, hips square, heel in line
Arms up above head	Breathe
Hands down	
Downward dog	
Modified plank	Knees or toes, hold 4 seconds
Tricep push-up down	4 counts
Cobra	In hale
Release to floor	Exhale
Tabletop	Inhale
Child's pose	Exhale
Table top	Inhale
Downward dog	Exhale
Step forward right foot high lunge	
Hands up	Breathe in
Hands on floor	Exhale
Warrior 1	Hold- angle left foot 45 and come up,
Arms up above head	Hips square forward; Breathe in and out
Hands down	
Downward dog	
Plank (or modified)	
Tricep push-up down	Go down to knees, and lower for 4 counts
Cobra	Inhale
Tabletop	Exhale
Release to floor	
Child's pose	

Downward dog	Step back left and right
Step forward with right foot into lunge	On knee, life upper body- hands center of chest
Revolve	Turn left elbow to outside of right knee- Breathe in and out
Back to center	
Hands down on either side of foot	
Tabletop	
Downward dog	Exhale
3-legged dog	Lift right leg, keeping hips square
Downward dog	
Plank (modified plank)	
Lower down tricep push-up	
Cobra and release	
Tabletop	Inhale
Downward dog	Exhale
Step forward with left foot and lunge	
Revolve	Turn right elbow to outside of left knee- Breathe in and out
Back to center	
Hands down	
Tabletop	Inhale
Downward dog	Exhale
3-legged dog	Lift left leg, keeping hips square, leg straight
Downward dog	
Modified plank/Plank	
Lower down tricep push-up	
Cobra and release	
Downward dog	Exhale
Step in right and left	
Forward fold	
Chair	Hold two breaths
Stand, arms up	Inhale
Mountain pose	Exhale
Tree pose (right) 2-3x	Weight on right foot, left foot on inside of leg (higher up is harder) – not right on knee
Tree pose (left) 2-3x	Weight on left foot, right foot on inside of leg (higher up is harder) – not right on knee
Stand arms above head	Inhale
Back bend	
Forward fold	Exhale

Downward dog	Step back right and left
Plank	Knees or toes
Tricep push up down	Knees
Cobra/half cobra	
Tabletop	Inhale
Downward dog	Step forward left and right; Exhale
Forward fold	
Chair (or balancing chair)	Inhale and Exhale
Stand arms up	Inhale
Mountain	Exhale
Bent knee stance	Weight on left leg - lift hold – take knee to side; arm up - repeat not holding leg
Bent knee stance	Weight on right leg - lift left knee and hold – take knee to side; arm up -
Mountain pose	Inhale
Forward fold	Exhale
Straighten back and lift upper body	Inhale
Fold forward	Exhale
Downward dog	Step back right and left
Table top	
Child's pose	Arms back
Table top	
Sit, knees bent to right side	
Lift & extend left arm straight up	
Extend left arm to right over ear	
Left elbow to floor, reach right arm over ear	
Sit, knees bent to left side	
Lift & extend right arm straight up	
Extend left arm to left over ear	
Right elbow to floor, reach left arm over ear	
Lay back	
Both knees to chest	
Right knee only into chest	
Left knee only into chest	
Release, legs bent, feet on floor	Hands to either side
Bridge x2	Hips to ceiling
Release, legs bent, feet on floor	
Drop knees to one side, head to other	
Switch sides	
Knees center	

Corpse pose	Lay on back, legs straight, hands at side, breathing x 4
Sit up, legs crossed	
Hands in front of body	NAMASTE (bend)